Eldorado National Forest

Biological Assessment
King Fire Restoration Project

PROJECT LOCATION:
El Dorado and Placer Counties, California

August 2015

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EFFECTS DETERMINATIONS:

Species	TES Status	Determination
California red-legged frog	Threatened	***Not Likely to Adversely Affect***
Sierra Nevada yellow-legged frog	Endangered	***May Affect, Likely to Adversely Affect***
Valley elderberry longhorn beetle	Threatened	No effect
Steelhead –Northern California DPS	Threatened	No effect
Delta smelt	Threatened	No effect
West Coast DPS of Fisher	Proposed Threatened	No effect

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I. INTRODUCTION

The purpose of this Biological Assessment (BA) is to review the proposed King Fire Restoration Project in sufficient detail to determine to what extent the proposed actions may affect species listed as threatened or endangered, or species proposed for such listing, or their designated habitats. In addition, the following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and /or proposed species and designated and/or proposed critical habitat by proposed federal actions. This BA is prepared in accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (50 CFR 402; 16 U.S.C. 1536(c)). The listed and proposed species that may be affected by the proposed action are shown in Table 1.

II. CONSULTATION TO DATE

Pursuant to Section 7(c) of the Endangered Species Act of 1973 as amended, a current list of threatened, endangered, proposed, and candidate species that may be present in the project area was requested through the ECOS-IPaC system on July 17, 2015 (Consultation Code: 08ESMF00-2015-SLI-0890, Event Code: 08ESMF00-2015-E-02797).

Informal consultation on the King Fire project has occurred in the form of meetings (12/3/14), phone conversations and emails between the project biologists and the Sacramento Field Office to receive assistance in planning project activities in the King Fire area. A field review of the project area was conducted on May 12, 2015 with Chris Nagano of the Sacramento Field Office to assist in planning project activities.

This consultation tiers to the USFWS programmatic biological opinion on three Sierra Nevada amphibians, issued December 19, 2014. Completed appendage form has been attached.

III. STATUS OF SPECIES AND HABITAT IN THE ACTION AREA

Table 1 displays species listed as threatened or endangered, or those proposed for listing, that may occur within the boundary of the project area. California red-legged frog (CRLF), Sierra Nevada yellow-legged frog (SNYLF) and the Valley elderberry longhorn beetle (VELB) will be analyzed in this Biological Assessment. Designated Critical Habitat and proposed Critical Habitat does not occur within the project area. The SNRLF and the VELB were not identified on the species list provided by the USFWS, but are evaluated since potential habitat for these species occurs in the project area.

Table 1. Threatened or Endangered Species that may occur within the project area.

Species	Population	Status	Critical Habitat
California red-legged frog *(Rana draytonii)*	Entire	Threatened	Designated – Not in project area
Sierra Nevada yellow-legged frog *(Rana sierrae)*	Entire	Endangered	Proposed – Not in project area
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus)*	Entire	Threatened	Designated – Not in project area

The species list provided by the USFWS identified two additional species occurring with the project area: the delta smelt *(Hypomesus transpacificus),*and Northern California distinct population segment of steelhead

(Oncorhynchus mykiss). Both species occur in the Central Valley and up river to man-made barriers. Habitat does not occur for either species in the project area, and the project does not have potential to affect downstream habitat due to the presence of several large dams on the South and Middle Forks of the American River downstream of the project area. Although not identified on the species list provided throught the ECOS iPAC system, the project occurs within the historic range of the west coast distinct population segment of the fisher (*martes pennant*) which is currently proposed for Federal listing. The King Fire project area is within the historic distribution of fisher in the Sierra Nevada Bioregion, but fisher are currently absent from the Central Sierra Nevada portion of their historic range (USDI Fish and Wildlife Service 2014) and since future recovery units have not been identified, fisher are not addressed in this Biological Assessment.

The Project area boundary is defined as the fire perimeter, and contains suitable or potential habitat for California red-legged frog (CRLF), Sierra Nevada yellow-legged frog (SNYLF) and Valley elderberry longhorn beetle (VELB) as shown in Appendix A, figures 1,2 and 3.

California Red-legged Frog

The California red-legged frog has been reduced over 70 percent from its historic range. Although found near sea level to about 5,200 ft. (1,500 m), most occurrences are below 4,000 feet (Federal Register 2006); all occurrences in or around the Eldorado National Forest are below 4,000 feet in elevation. Preferred habitats include: quiet side channel pools of low gradient streams, marshes, and ponds. Long overland movements (up to 1 mile between breeding habitats) into terrestrial habitats during the rainy season have been documented. The species is more abundant in coastal areas of the geographic range and found only within isolated portions of the Sierra Nevada Range.

The California red-legged frog Recovery Plan identifies Recovery Habitat (USDI 2002), but recovery habitat does not occur within the King Fire Project area.

Breeding habitat

All life history stages are most likely to be encountered in and around breeding sites, which are known to include marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as artificial impoundments such as stock ponds, irrigation ponds, and siltation ponds (USDI 2005). California red-legged frog larvae remain in these habitats until metamorphosis in the summer months.. Young California red-legged frogs can occur in slow moving, shallow riffle zones in creeks or along the margins of ponds. Creeks and ponds where CRLFs are found most often have dense growths of woody riparian vegetation (USDI 2006, Hayes and Jennings 1988). These habitats may be provided by perennial and/or intermittent streams.

Non-breeding Aquatic and Foraging/Sheltering Habitats

In summer, California red-legged frogs are often found close to a permanent pond or a deep pool in a creek where emergent vegetation, undercut banks, or semi-submerged rootballs afford shelter from predators. California red-legged frogs may also disperse from breeding habitat to forage and seek summer sheltering habitat when water becomes unavailable. California red-legged frogs will take shelter in small mammal burrows and other upland refugia on the banks up to 100 meters (300 feet) from the water any time of the year and can be encountered in a variety of upland settings (Jennings and Hayes 1994; USDI 2002). These habitats may be provided by perennial and/or intermittent streams. California red-legged frogs are frequently encountered in open grasslands occupying seeps and springs. Such bodies may not be suitable for breeding, but may function as foraging habitat or refugia for dispersing frogs.

Dispersal Habitat

After precipitation events California red-legged frogs may roam from aquatic sites as much as 1.6 kilometers (1 mile). California red-legged frogs will often move away from water after the onset of fall rains resulting in ¼

inch of precipitation (Tatarian 2008) causing sites where California red-legged frogs were easily observed in the summer months to appear to be absent of this species. Additionally, California red-legged frogs will sometimes disperse in response to receding water which often occurs during the driest time of the year. California red-legged frogs may move up to 3 kilometers (1.8 miles) up or down drainages and are known to wander throughout riparian woodlands up to several dozen meters from the water. Dispersing frogs have been recorded to cover distances from 0.40 kilometer (0.25 mile) to more than 3.2 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors, however 2 miles is an upper limit and a 1.0 mile dispersal distance will ensure that connectivity between breeding habitats will be maintained (USDI 2006). California red-legged frogs have been observed to make long-distance, straight-line, point to point migrations rather than using riparian or drainage corridors for moving between habitats. Dispersal distances are considered to be dependent on habitat availability and environmental conditions such as water permanence.

Habitat mapped in the Project Area

Habitat has been mapped using a GIS modeling process and has not been verified by field surveys. Mapping is expected to overestimate suitable habitat for the CRLF.

B**reeding Habitat** was mapped as: 1) low-gradient perennial and intermittent streams (less than 2% gradient) below 4,000 feet in elevation; 2) absence of high flushing flows during breeding season; and 4) ponds below 4,000 feet in elevation (other than reservoirs unsuitable as breeding habitat) (per. com. J Williams or D Lipton).

GIS mapping identified potential breeding habitat in short low gradient (less than 2 percent) reaches of Slab Creek, Esmerelda Creek and Brush Creek and ponded habitat in Forebay and Brush Creek Reservoirs. These areas represent marginal marginal breeding habitat potential due to 1) the lack of ponded habitat typical of CRLF breeding locations in the Sierra Nevada 2) short isolated segments of low gradient stream that are more than a mile from ponded habitat, and 3) ponded habitat occurs in only two small reservoirs with marginal suitability to support CRLF due to fluctuating water levels, heavy foot traffic and recreation use, and lack of emergent vegetation. The likelihood of CRLF occupancy in the project area is therefore considered low.

Table 2. Potential CRLF breeding habitat within a mile of the project area.

HUC 7 Watershed	Stream (miles)	Ponds/ meadows (acres)
Headwaters Slab Creek	1.6	--
Lower Slab Creek	1.4	--
South Fork American River – Brockliss Canyon	0.2	--
Upper Chili (Brush Creek Reservoir)	--	2.7
Long Canyon-South (Forebay Reservoir)	--	20.7
Total breeding habitat	**3.2**	**23.4**

Non-breeding Aquatic and Foraging/Sheltering habitats were mapped as all perennial and intermittent streams and waterbodies within one mile of the above potential breeding habitats and include the terrestrial habitat occurring within 300 feet of this aquatic habitat.

Dispersal habitat is mapped as all terrestrial habitat areas within one mile of mapped breeding habitat covering an area of approximately 17,000 acres.

Appendix A, Figure 1, dipslays the CRLF habitat mapped in the project area.

Surveys Conducted in the Project Area

California red-legged frogs (CRLF) have not been detected in the King Fire Restoration Project area during past survey efforts in the area (Table 3). The nearest occurrences recorded within the past 20 years are in the North

Fork Weber Creek, approximately 2.3 miles south of the project area and in a watershed outside the project area, and in a ponded area near the confluence of the Rubicon River and the Middle Fork American River, approximately nine miles downstream from the burned area (USFS NRIS). Survey effort has not been comprehensive nor sufficient to conclude that potential areas of breeding habitat are unoccupied, but the limited amount and isolated distribution of low gradient stream habitat, combined with the lack of positive survey detections, suggests a low potential for CRLF occupancy in the project area.

Table 3. Eldorado National Forest Amphibian and Reptile Surveys Within the King Fire Perimeter.

Location	**Date**	**Method**	**Observations and Findings**
Brush Creek	July, 13, 2011/July 2003	Two Day/Two Night Survey for CRLF	No Findings
Pilot Creek	July, 7, 2011	Two Day/Two Night Survey for CRLF	No Findings
Rubicon River	August, 9, 2012	One Day	No Findings
Silver Creek	July, 24, 2013	VES (Visual Encounter Survey)	Only Tree Frogs, No other amphibians.
Gasparni Creek	April, 29, 2010 May, 10, 2010 May, 24, 2010 June, 29, 2010 July, 7, 2010 October, 7, 2010	One Day VES One Day VES One Day VES One Day VES One Day/Two Night Time Surveys for CRLF One Day VES	No Findings No Findings No Findings No Findings No Findings No Findings
Soldier Creek	July, 2003	Two Day/Two Night CRLF Surveys	Two Foothill Yellow-legged Frogs (FYLF)

Sierra Nevada Yellow-legged Frog

The Sierra Nevada yellow-legged frog (SNYLF) is listed as Federally endangered with proposed designation of critical habitat, and is a Region 5 Forest Service Sensitive Species (Federal Register 2014; Federal Register Vol.78, No. 80; USDA 2013). There is not a final rule on the proposed critical habitat to date. The SNYLF is endemic to the northern and central Sierra Nevada mountain range of California and Nevada, ranging from Monarch Divide and Independence Creek in the south to the southern edge of the Lassen National Forest in the north. SNYLFs occur from approximately 4,500 feet to over 12,000 feet (Jennings and Hayes 1994).

Highest summer densities and overall total numbers of SNYLF are found in fishless lakes of more than five feet deep and with near-shore habitat where temperatures are warmer than the pelagic area of lakes (Matthews and Pope 1999). While frog populations show a positive correlation with deep water habitats (Knapp 2005), both tadpoles and adults are most commonly found along open, gently sloping shorelines that provide shallow waters of only two to three inches in depth (Mullally and Cunningham 1956, Jennings and Hayes 1994, Federal Register 2013). At lower elevations within their historical range, the frog is associated with rocky streams and wet meadows surrounded by coniferous forests (Zweifel 1955). The SNYLF is rarely found exclusively in small or ephemeral streams, which typically lack sufficient depth and hydroperiods for adequate refuge and overwintering habitat, however at lower elevations these small streams can provide suitable habitat for post-metamorphic life stages (Jennings and Hayes 1994).

Suitable SNYLF breeding habitat can be described as permanent water bodies (or perennial waterbodies that are connected to or close to permanent waters) that are deep enough to prevent freezing in winter, free of fish or other introduced predators, support a natural flow pattern, and regularly maintain water persistence to allow for tadpole development. The timing of breeding varies annually, but occurs shortly after snowmelt, typically between May and July. Adults sometimes travel over ice or snow to reach preferred breeding locations early in the season without apparent ill effects (Matthews and Pope 1999; Vrendenburg et al. 2005). Adults may move between selected breeding, feeding, and overwintering habitats during the course of the year. Though typically found near water, overland movements by adults of over 217 feet have been routinely recorded (Matthews and Pope 1999). The furthest reported distance from water is 1,300 feet (Federal Register 2013a).

Habitat Mapped in the King Fire Area

SNYLF habitat has been mapped in the project area, using the definition of habitat developed in coordination with the Sacramento Field Office of the U.S. Fish and Wildlife Service for Programmatic Consultation on Forest Service projects that may affect the species:

> Suitable breeding habitat typically occurs above 4,500 feet in elevation (but in some areas, including on the west side of the Plumas National Forest, is known to occur as low as 3,500 feet in elevation) and includes permanent water bodies or those hydrologically connected with permanent water such as lakes, streams, rivers, tarns, perennial creeks (or permanent plunge pools within intermittent creeks), and pools (such as a body of impounded water contained above a natural dam). Most types of water are suitable habitat for adults and subadults including lakes, ponds, tarns, streams, rivers, creeks, plunge pools within intermittent creeks, seeps, springs, and wet meadows plus surrounding areas up to a distance of 25 m (82 ft). Where proximate water bodies occur within 300 m (984) feet of one another (typical of some high mountain lake habitat), suitable habitat for dispersal and movement includes the overland area between lake shorelines; in mesic habitats such as lake and meadow systems, the entire area of physically contiguous or proximate habitat is suitable for dispersal and foraging.

Using this definition, GIS mapping of SNYLF was provided. taking into account expert knowledge of the species range within the Sierra Nevada (R.Knapp), representing elevations, known localities, and river drainages. Aquatic habitat and upland habitat within 82 feet of aquatic habitat, is included in the mapping. A total of 1,250 acres of suitable SNYLF habitat is present in the project area, and within 1,000 feet of the project area (Table 4, Appendix A, Figure 2).

Table 4. SNYLF habitat in the King Fire Project Area.

Location	Habitat Acres
Lower South Fork Rubicon River	85
North Fork Long Canyon Creek	73
Rubicon River-Ellicott Bridge	214
Rubicon River-Hell Hole Reservoir	215
Rubicon River-Stony Creek	215
South Fork Long Canyon Creek	304
Wallace Canyon	60
Other Watersheds	83
TOTAL	**1,250**

Surveys Conducted in the Project Area

Surveys conducted in the project area are displayed in Table 3. SNYLF have not been detected in the King Fire Restoration Project area during past survey efforts in the area. The nearest recorded occurrences are approximately 3 miles from the project area. Although considerable urvey effort has occurred in high quality habitat, surveys have not been comprehensive nor sufficient to conclude absence from potential habitats.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (VELB) is listed as Threatened under the Endangered Species Act. Critical Habitat has not been designated on the Eldorado National Forest. The VELB is thought to range from the Central Valley into the eastern portion of the Coast Range and the foothills of the Sierra Nevada up to approximately 3,000 feet in elevation (USFWS 1999) and is most often found along the margins of rivers and streams in the lower Sacramento River and upper San Joaquin Valley. Habitat for the VELB consists of elderberry shrubs and trees in a variety of habitats and plant communities, but most often in riparian, elderberry savannah or moist valley oak woodlands. Adequate size is defined as stems greater than one inch in diameter at the base (Barr 1991).

Habitat Mapped in the King Fire Area

The area near the southern boundary of the King Fire project area is below 3,000 feet in elevation and within the potential geographic range of the VELB (Appendix A, Figure 3). During project planning it was assumed that elderberry plants and the valley elderberry longhorn beetle could occur in this area, though the species has not previously been detected on the Eldorado National Forest. In addition, past project surveys have rarely located elderberry plants of sufficient size to support the species.

Surveys Conducted in the Project Area

Project treatment areas were surveyed by Forest Service botanists during the spring and summer of 2015. Elderberry plants were not detected in project activity areas.

IV. DESCRIPTION OF THE PROPOSED ACTION

Action Area

The King Fire started September 13, 2104 and burned approximately 97,000 acres on the Eldorado National Forest (ENF) and on adjacent private timber lands (Figure 1). The project area for this analysis is the approximately 63,000 acre portion of the King Fire that occurred on ENF lands within the Georgetown, Pacific, and Placerville Ranger Districts administrative boundary. Elevation within the project area ranges from approximately 2,000 to 7,000 feet. Treatment areas are the areas where activities associated with the proposed project would occur.

The King Fire Restoration project area includes all National Forest lands within the boundary of the King Fire. The area is situated approximately 3 miles east of Georgetown, California in the vicinity of Darling Ridge, Mace Mill, and Balderston Station. The 9,800 acre proposed project area is primarily within the Mixed Conifer Forest Zone between elevations of approximately 2,200 and 3,500 feet. The proposed actions will likely span over a 5 – 7 year period from implementation which could start within the 2013 calendar year.

Table 5 Areas Identified for Treatment in the Proposed Action (Alternative 2 of the DEIS).

Area Proposed for Treatment	Approximate Acreage[1]

Wildland Urban Interface Defense Zones	968 acres
Strategic Fire Management Zones	8,465 acres
Conifer Forest Resiliency Areas	5,709 acres
Rubicon Prescribed Fire Area	2,058 acres (an additional 783 acres overlaps with other areas for a total of 2,841 acres)
Total	**17,200 acres**

[1] Acreage may be adjusted subject to field verification.

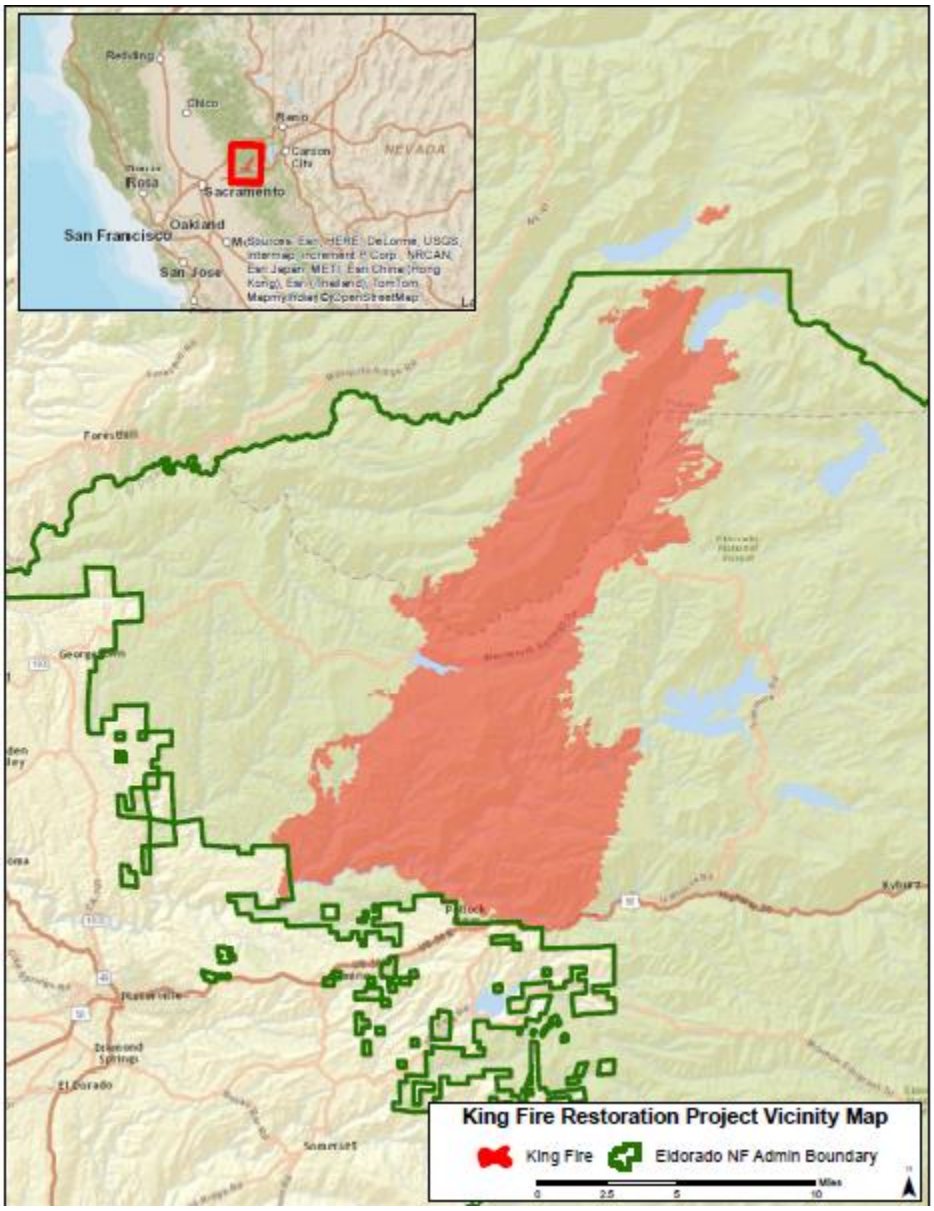


Figure 1. King Fire Restoration Project Vicinity.

Project Activities

A complete description of project activities and design criteria is provided in the King Fire Restoration Project Draft Environmental Impact Statement (DEIS). The following summarizes activities that may affect species analyzed in this BA, and describes Design Criteria that would be implemented to minimize or reduce potential effects to these species.

Salvage and Fuel Reduction Treatments in Strategic Fire Management Zones (SFMZs) and Conifer Resiliency Areas

The Proposed Action includes removal of fire-killed trees through salvage logging, fuel reduction treatments, and hazard tree removal on up to 16,000 acres of NFS lands using mechanical logging of timber or biomass; skyline logging; and hand cutting, piling, or masticating. Inside Wildlife Urban Interface (WUI) Defense Zones, Strategic Fuels Management Zones (SFMZ), and Conifer Forest Resiliency Areas, dead conifers will be reduced or removed where in excess of soil cover and wildlife snag retention needs. Treatments will be applied to conifers that have only brown foliage or no foliage remaining, as viewed from the ground.

Hazard Tree Removal

Hazard Areas are areas containing hazard trees along Forest Service system roads open to the public and roads needed for access to treat areas, along private residential property, adjacent to structures and range improvements, and in specific cultural resource sites identified by the archeologist. Hazard trees will be either felled to abate the hazard or removed to reduce fuel loadings. Hazard trees to be removed are dead and dying trees that have potential to reach the road or adjacent non-Forest Service properties and live trees that are sufficiently damaged or defective to pose a risk of falling within the next five years. Dying trees would be identified using the publication *Marking Guidelines for Fire-Injured Trees in California* (Smith and Cluck, 2011) at a 90 percent probability of mortality in RCAs and Protected Activity Centers, and a 70 percent probability of mortality elsewhere. Live damaged and defective trees would be identified using the publication *Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region* (Angwin et al. 2012).

Logging Methods and Machinery

The following methods will be utilized as applicable in areas described above for treatment:

- On slopes generally less than 35 percent and subject to exclusion zones described in the design criteria, methods of tree removal would include mechanized logging that generally utilize feller bunchers and rubber tire or track mounted log skidders; cut-to-length systems that utilize an in-woods tree processor and log forwarder; conventional logging systems that employ timber fallers with chainsaws and rubber tire or track mounted log skidders; and logging with a heel-boom or excavator mounted log loader (commonly referred to as "shovel or heel boom" logging).
- On slopes generally exceeding 35 percent, methods of tree removal would generally be aerial logging with a skyline system. In areas identified by the soil scientist and/or hydrologist that are suitable, shovel logging or ground based logging may be considered. Skyline machinery would operate from roads. Shovel or heel boom loaders would operate within areas designated by the Forest Service.
- Log landings and decking areas would generally employ one or more of the following: log loaders, chainsaws, tree processors, chippers, log trucks, fuel trucks, and chip vans. Fuel would be stored in areas designated by the Forest Service away from any risk of stream contamination.
- In areas identified for treatment, the maximum desired surface fuel loading is 6-10 tons per acre of material less than 3 inches in diameter. All existing logs would be retained on site and additional large logs left to total approximately five per acre. Additional logs to be left are greater than or equal to 15 inches in diameter and over 10 feet long, with a preference for leaving the largest size class representative of the area. To meet the desired fuel levels, tops, limbs, and unmerchantable boles of harvested trees, and small dead trees that are not removed using the logging methods described, would be treated by one or more of the following methods: cutting to within 18 inches of the ground and scattering the removed material, cutting and leaving the removed material in place, hand piling, mastication or chipping with a track mounted masticator or chipper; and/or cutting trees and piling using tractors or rubber tire machinery with brush rakes or grapples. Piles would be burned.

Treatment Exclusion Zones

Table 6. Exclusion zones for mechanical equipment in proximity to aquatic features.

Aquatic Feature Type[1]	Exclusion Distance In Feet[2]
Perennial Streams and Special Aquatic Features	100
Intermittent Streams above 4,500 feet elevation	100
Intermittent Streams below 4500' elev.	50
Ephemeral Streams above 4,500' elev.	25
Ephemeral Streams below 4,500' elev.	10

[1] Perennial streams flow year-long. Intermittent streams flow during the wet season but dry by summer or fall. Ephemeral streams flow only during or shortly after rainfall or snowmelt. SAFs include lakes, ponds, meadows, bogs, fens, wetlands, vernal pools, and springs.

[2] Or 25 feet beyond riparian vegetation, whichever is greater. Riparian vegetation is composed of the plant species that grow in or adjacent to streams, meadows, seeps, springs, etc., where soils are inundated or saturated for varying durations of the growing season. Typically, some or many of these component species are classified as obligate wetland or facultative wetland by the USGS. Examples include willows, alders, dogwood, big-leaf maple, Indian rhubarb, monkey flower, sedges, rushes, mosses, etc

Operating Requirements Within Equipment Exclusion Zones:

- Equipment reach in for removal of logs by full suspension may be allowed upon consultation with the RCA team, which includes a hydrologist, soil scientist, botanist, and aquatic biologist.
- The RCA team will review any potential use of existing landings within mechanical exclusion zones.
- Localized exceptions to operating requirements or equipment exclusion may occur where recommended by the RCA team to benefit riparian, aquatic and hydrologic resources.
- Water drafting, and watershed sensitive area restoration actions may occur within the equipment exclusion zone consistent with all other Design Criteria.

Operating Requirements Within the Riparian Conservation Area (RCA), but outside the Equipment Exclusion Zone

- Use existing skid trails and landings to the extent use will avoid impact from new trails and landings.
- Consult with a member of the RCA team for new landing construction or expansion of existing landings.
- Do not construct new primary skid trails or landings within 150 feet of perennial or intermittent streams or SAFs.
- Do not construct new primary skid trails or landings within 50 feet of ephemeral streams; concurrence from RCA team is required for new landing construction within 150 feet of ephemeral streams.
- Use only low ground pressure track laying machines, such as feller bunchers and masticators, rubber tired skidders and track laying tractors.

(The full description of project Design Criteria to protect riparian, aquatic, soil, and water resources is provided in Appendix B. Appendix C describes Riparian Conservation Objectives (RCOs) and associated Standards and Guidelines (S&Gs) of the Sierra Nevada Forest Plan Amendment (SNFPA) of 2004, as applied to the King Fire restoration project).

Watershed Sensitive Area (WSA) Treatments

Watershed Sensitive Areas (WSAs) are specific areas determined to be at high risk of soil erosion and sedimentation which could negatively impact watershed resources. Criteria for delineating and evaluating WSAs included: high existing ground disturbance density, potential to impact water quality and riparian habitat, burn severity, slopes greater than 15 percent, shape and length of slope, existing or predicted deficiency in

ground cover that would persist longer than one season, high soil Erosion Hazard Rating, proximity to riparian-associated sensitive species, and proximity to drainages and high runoff soils.

Proposed actions within WSAs are to:

- Increase soil cover, surface organic matter and soil organic matter on sensitive soils or where accelerated runoff and erosion could pose unacceptable risk to resources as a result of the proposed activities. These activities include mastication or lop and scatter of trees less than 10 inches in diameter where mastication is impractical; cut, lop, and scatter trees up to 16 inches in diameter; use of a cut-to-length logging system, cut and leave in place, certified weed-free straw mulch applications or seeding with approved native seed.
- Rehabilitate soil disturbances (old skid trails, landings, windrows). These activities include subsoiling, waterbarring, removal of inslope berms, outsloping, backblading, rehabilitating windrows, and slash placement.
- Improve channel condition and stabilize gullies. Treatments could include additional large woody debris, stabilization of headcuts and gullies with wood or rock and reshaping headwalls, reshaping of streambanks along incised channels, and planting riparian vegetation.

Table 7. Watershed Sensitive Area (WSA) Treatment Acreages

Total WSA (acres)	778
Increase cover (acres)	379
Rehabilitation of existing disturbance (acres)	91
Channel work (feet)	1,450
Hand straw application (acres)	23

Prescribed Fire Treatments

Prescribed fire will be applied using helicopter lighting methods in an area on the south slope of the Rubicon Canyon for a total of 2,841 acres. It is estimated that this treatment would be applied in 5-7 years to break up the continuity of shrubs and fuel on this slope. The desired condition is a mosaic pattern with 40-60 percent of the acres treated. Piles created from vegetation treatment activities will be burned, generally within one to three years post treatment.

Invasive plant infestations may be torched with a handheld propane device to control the infestation if determined to be the most effective method of treatment given species ecology and site conditions.

Road Work

Roads will be maintained or improved to reduce erosion and facilitate other proposed treatment activities. Road repair and improvement includes outsloping, clearing debris and surface grading, culvert replacement or installation, installation of drivable dips and waterbars, slipout repair, application of aggregate surfacing, and waterhole repair on approximately 92 miles of level 1 and 2 roads. Road maintenance activities, including surface grading and culvert cleaning, would occur on approximately 169 miles of level 1, 2, 3, and 4 roads. Barriers will be constructed or installed using native materials (logs, vegetative material, rocks) to prevent off-road vehicle access to sensitive sites where there is an increased threat of vehicle intrusion due to loss of

screening vegetation and snags. Additionally, concrete abutments for the bridge over Brushy Creek will be re-constructed to replace the existing bridge support structure.

No new system roads will be constructed. However, temporary roads may be constructed to access landings. Following use, any cut or fill slopes will be reshaped into surrounding slope and temporary roads will be scarified, drained, and blocked to vehicular traffic.

Dust abatement using water, or dust palliatives (magnesium chloride or lignin sulfonate) would occur during log hauling as needed to mitigate dust.

Reforestation and Release Treatments

Planting of seedlings would occur on approximately 11,561 acres of conifer forest types where a forested community is the desired condition, but where natural regeneration of a desired species composition and density are not expected to occur within the next several decades. Except in limited circumstances where site preparation to treat residual fuels is not needed (approximately 428 acres), salvage logging or fuel treatment would be completed before planting takes place. Refer to the DEIS for the desired stand condition and initial planting densities.

At the time of planting, the ground would be hand scraped so that there would be a radius of 2 to 5 feet around each seedling, depending on competing vegetation and the planned follow-up treatment. After the initial planting, the need for follow-up inter-planting would be determined based on seedling survival exams within the first three years after planting. The inter-planting would be conducted to return the stand to the original planting density/composition and would only occur within the first three years after the original planting.

Release treatment of seedlings from competing vegetation would occur on 11,660 acres where competing vegetation is expected to reduce seedling survival or growth below an acceptable level based on analyzed treatment methods and vegetation competition. Shrubs have generally been considered the most competitive type of vegetation in young conifer plantings. Some herbaceous species may also reduce the survival of planted seedlings in certain circumstances, primarily during the initial establishment phase.

Chemical Release Treatments
Herbicide would be used to release planted and natural regeneration where competing vegetation is expected to reduce seedling survival and growth within the first five years after planting. Ground-based application of Glyphosate herbicide is proposed using a directed low nozzle pressure spray (15 psi) to target competing vegetation as follows:

- Initial Release Treatment: Within 0 to 3 years after planting, a 5-foot radius around planted trees would be treated for complete control of competing herbaceous and woody vegetation. Outside of this radius, all shrubs would be treated in order to reduce live shrub cover to less than 20 percent, initially, while herbaceous species and oaks would not be treated.

- Follow-up Release Treatments: Additional treatments as described above would occur if shrub cover is projected to be greater than 30 percent within 5 years after planting, and the areas of high shrub cover occur in patches larger than 10 acres covering more than 15 percent of the unit.

Table 2 of the DEIS gives the proposed herbicide chemical formulation, application rate, and additives. Herbicide application is not proposed within the buffers for streams and aquatic features as summarized in Table 8.

Table 8. Aquatic Feature Herbicide Application Exclusion Zones

Aquatic Feature	Distance (feet)
Perennial stream and special aquatic feature	300
Intermittent stream	150
Ephemeral stream	25
CRLF habitat[1]	300

[1]CRLF habitat includes identified ponds, and mapped perennial, and intermittent streams below 4,000 feet elevation.

Manual Release Treatments

Initial manual release treatments are estimated on approximately 572 acres within RCAs. Initial and follow-up treatments would involve hand cutting (grubbing) competing vegetation in a 5- to 8-foot radius around planted and desired natural seedlings.

Spatial and Temporal Relationship of Treatment Activities to Species and Their Habitat

The acres and types of treatments occurring in California red legged frog, Sierra Nevada yellow-legged frog, and Valley elderberry longhorn beetle habitat is shown below and in figures 2 and 3. These activities and the habitat affected will be discussed in greater detail in section VI of this BA.

Acres of Alternative 2 Treatments in CRLF Habitat	Acres
Hand cut fire-killed trees	4.8
Hazard – hand felling hazard trees	45.6
masticate/hazard (no mechanized equipment)	47.2
Roadside Hazard Tree Felling	244.7
Brushy Watershed Sensitive Areas	5.4
Total	**347.7**

Acres of Alternative 2 Treatments in SNYLF Habitat	Acres
Burn only – prescribed fire treatment	7.1
Hazard – hand felling hazard trees	6.0
Roadside Hazard Tree Felling	19.2
Long Canyon Stream Restoration	5.8
Total	**37.8**

Acres of Alternative 2 Treatments in Potential VELB Habitat	Acres
Biomass removal	1
Hand felling fire-killed trees	156
Roadside Hazard Tree Removal	145
Total	**302**

V. ENVIRONMENTAL BASELINE AND CUMULATIVE EFFECTS

Riparian Habitats in High-severity Fire Areas
In riparian areas that burned at high intensity, all groundcover, riparian vegetation, and coarse and fine woody debris were consumed. Even woody material within the stream channel was often consumed in these areas. This loss of soil organic matter and groundcover left extensive areas susceptible to erosion. Precipitation events since the fire resulted in rill erosion and sediment deposition in streams in many of these areas. Sediment deposition of up to two feet has been observed in some streams, and pools in these locations are nearly or completely full of sediment. Resprouting riparian vegetation was also observed at many locations in high-severity burn areas.

Riparian Habitats in Moderate and Mixed Severity Fire Areas
Riparian areas that burned at moderate severity caused some damage to riparian vegetation, but not as extensive damage as in high severity. Areas of moderate soil burn severity often consumed a high percentage of existing groundcover, but not all vegetative matter and leaves were burned, which moderated the risk of post-fire soil erosion. Erosion and sediment deposition to streams were observed in these areas, but not as severe as in areas of high burn severity. Re-sprouting riparian vegetation was observed in these areas.

Riparian Habitats in Low Severity Fire Areas
Riparian areas that burned at low severity caused little damage to riparian vegetation. Post-fire conditions in these areas are similar to unburned areas. Some groundcover and vegetation was burned; however, exposure of bare soil is limited, and erosion and sediment transport to streams has been minimal since the fire ended. In general, riparian zone vegetation was not impacted in areas of low-burn severity.

Aquatic Habitat Conditions Resulting from King Fire
The overall effects of the King Fire on suitable habitat for aquatic species included:

1. Losses of upland and riparian vegetation which reduced the canopy cover, groundcover, and dispersal habitat for semi-aquatic species and resulted in increased water temperatures;
2. Losses of soil infiltration capacity which, coupled with the reduced vegetation, often results in increased runoff and higher flows; and
3. The intensified runoff and higher flows, in turn, resulted in increased amounts of sediment entering the aquatic habitats.

The areas with the greatest slopes and highest burn severity likely experienced the greatest risk of post-fire erosion, with the greatest risk of sediment entering the aquatic habitat and affecting aquatic species and their habitats. Increased soil erosion and stream sediment delivery to waterways will occur for the next several years as a result of the fire itself, with the greatest amount of sedimentation occurring in high burn severity areas. Greater soil erosion and sediment delivery will occur in areas with persistent hydrophobicity and complete consumption of groundcover and, absent treatments, increases in groundcover would be slow to occur in these areas. Areas that burned at high intensity will remain susceptible to increased erosion and sediment delivery to streams without groundcover treatments.

The number of watersheds above a Threshold of Concern (TOC) for sediment delivery, will increase in the next year due to a combination of the impacts of the fire itself and salvage logging on private land. By 2025, although the risk to watersheds would improve, 10 watersheds would remain above the TOC. The continuation of Burned Area Emergency Response (BAER) treatments, mainly application of straw mulch using helicopters and maintenance of Eleven Pines Road, will help decrease the sedimentation that would otherwise occur. In general, the greatest risks to aquatic species as a result of the cumulative projects are associated with increased sedimentation from logging operations over large portions of a species habitat within a watershed, and a reduction in large woody debris recruitment as a result of widespread tree removal. Based on the Cumulative Watersheds Efffects analysis (CWE) that evaluated the risks of stream function and stability on a cumulative level, the cumulative watershed effects of Alternative 2 treatments would be minimal, largely due to the rationale that because post-fire logging takes place in areas with already disturbed soils and canopy, it can be concluded that logging would not add significantly to the already altered landscape (refer to the Watershed section of the King Fire Restoration EIS). However, the CWE analysis indicates that with implementation of Alternative 2, two watersheds in addition to those under Alternative 1 would exceed the TOC. These are Silver Creek-Camino Reservoir and South Fork American River-Slab Creek Reservoir, which provide potential habitat for California red-legged frog.

The risk would be the greatest in areas with intense salvage harvesting, which would be expected to occur under the private salvage operations, which are the majority of cumulative projects affecting CRLF habitat. Ninety-seven percent of the Lower Slab Creek watershed burned in the fire, but according to the CWE, it is currently below the TOC. With the cumulative projects considered, the risk of cumulative watershed effects would increase significantly over the next year, but would drop to near current by 2025. Seventy-four percent of the Headwaters Slab Creek watershed burned in the fire. This watershed is currently above the TOC, and the risk of cumulative effects will increase by nearly 120 percent in the next year. However, by 2025, it will have reduced to better than present conditions. The potential for direct risks to individuals as a result of cumulative projects is relatively low, as habitat is marginal and CRLF have not been identified in the project area during previous surveys. Recruitment of large woody debris in CRLF upland habitats may be cumulatively affected by the salvage and hazard tree reduction actions. The removal of greater numbers of trees from salvage operations would contribute to a long-term decrease in large woody debris. With the design criteria and BMPs in place for CRLF, the project's contribution to these cumulative effects would be negligible.

VI. EFFECTS OF THE ACTION

California Red-legged Frog

Acres of Alternative 2 Treatments in CRLF Upland Habitats	Acres
Hand cut fire-killed trees	4.8
Hazard – hand fell hazard trees and leave in place	45.6
Masticate/hazard (without mechanical equipment)	47.2
Roadside Hazard Tree Felling	245.0
Watershed Sensitive Areas – hand treatments	5.4
Total	**347.7**

Approximately 350 acres of potentially suitable habitat occurs within the proposed treatment areas (Figure 2). Because CRLF have not been found within the project area during previous amphibian surveys and the potential breeding habitat is extremely limited, the areas of potential habitat within the treatment areas are likely over-estimated and the risk of injury, mortality, or behavioral disturbance is quite low (see Affected Habitat section).

The following discussion of potential effects should be considered in combination with the low probability of species occurrence.

Felling of Roadside Hazard Trees and Other Hazards

Design criteria prohibit operation of ground-based mechanical equipment within 300 feet of CRLF aquatic habitat, removing the risk to individuals from equipment operations. Treatments occurring within 300 feet of CRLF aquatic habitat have been limited to hand-felling trees for abatement of imminent roadside hazards (245 acres), and hand-felling other hazard trees on approximately 98 acres. Figure 2 displays the overlap between CRLF aquatic and upland foraging/sheltering habitat and proposed treatment areas. Tree felling within CRLF habitat could affect individuals; however, design criteria require hand felling away from the aquatic habitat, reducing the risk to CRLF and its aquatic habitat. Hazard trees felled within CRLF habitat would be left in place to avoid further site disturbance, unless otherwise determined by a qualified biologist, which would involve surveys prior to using equipment to remove the tree.

As with any species occurring within the action area, CRLFs have the potential to be killed or injured from falling trees during tree removal activities, if the individual does not flee. CRLF spend extended periods of time in upland habitat, and may use rodent burrows or moist vegetation or downed wood for cover, but during dry periods, the CRLF is rarely encountered far from water (USFWS 2002). Design criteria would exclude mechanical operations from occurring within 300 feet of suitable breeding and non-breeding aquatic habitat, the distance within which frogs might be sheltering or foraging. In addition, no off-road mechanical operations would occur within one mile of breeding habitat during the wet season (defined as starting with the first frontal rain system that deposits a minimum of one-quarter inch of rain after October 15 and ending April 15) when frogs move greater distances from aquatic habitat. The limiting operating periods within the potential migratory pathway would minimize the potential for direct effects to migrating CRLF adults. In addition, mechanical operations would not be implemented until soils are considered dry enough.

Falling snags are the only source of large woody debris recruitment until new trees grow large enough to fall into streams, which may take decades to centuries (Beechie 2000, Reeves 2006). The general role and function of large woody debris in creating habitat complexity in streams and riparian habitat is important to herpetafauna including the CRLF. Individual pieces or aggregates of large woody debris in the channel can create habitat by trapping sediment upstream and creating pools downstream of the obstruction. Log jams are typically very complex and provide a cool, moist microclimate with ample cavities that can be used as refuge habitat. Large woody debris within the adjacent riparian zones is also important as it provides cover and refugia and contributes to improved water quality by trapping fine sediment and preventing it from entering stream channels (Wondzell and King 2003). Hazard tree felling within the CRLF buffer would not reduce the supply of large woody into CRLF habitat, since hazard trees felled within the CRLF buffer would generally be left in place. Where felled trees must be removed, design criteria require that a minimum of 10 to 20 pieces of large wood (standing and on the ground) shall be retained per acre. Large wood is defined as being a minimum of 12 inches in diameter and 10 feet in length.

CRLF habitat buffers identified in the design criteria would also avoid habitat disturbance from heavy equipment, as trees would only be felled by hand and either left in place, piled, or removed through full suspension or equipment reach in. Since hand treatments produce negligible ground disturbance, these actions would not contribute to sediment input into adjacent aquatic habitat. In addition, hand treatments within RCAs would include lopping and scattering or mastication, which would provide more groundcover than is currently present, thereby reducing existing sediment transport.

Because the risk of direct impact is highest when equipment operates in close proximity to the aquatic habitat, equipment exclusion minimizes the likelihood of direct impacts to CRLF.The chances of individuals being crushed from trees being hand felled are anticipated to be low because the probability of CRLF being struck by

an individual hazard tree would be small. The low encounter rate stems from both the low probability of CRLF occurrence in the project area and the localized felling of hazard trees.

Road Construction, Reconstruction and Maintenance

All road maintenance activity (grading, brushing, etc.) within one mile of occupied habitat or within 300 feet of perennial or 150 feet of intermittent streams providing potentially suitable breeding habitat would occur outside of the LOP. Design criteria require that for new stream crossings the RCA team must be consulted with for site-specific evaluation and requirements, which would involve site-specific evaluation by an aquatic biologist.

Water drafting is proposed for dust abatement on roads. Drafting has the potential to entrain (suck in) tadpoles or fish as the pump pulls in water. Entrainment and passage through the pump could be fatal to individuals or if the water is dispensed on a road or an upland area, mortality would likely result. Design criteria, such as the use of low intake velocity pumps and a screening device placed around the pump intake, would be implemented to reduce potential negative effects. Since design criteria also require that each water drafting site be evaluated by an aquatic biologist prior to use, water drafting poses little risk to this species. Design criteria will also eliminate the risk of dewatering by limiting amount of drafting depending on streamflows and water levels to meet BMPs and through coordination with the RCA team.

Dust palliatives such as magnesium chloride (MgCl2) or lignin sulfonate are commonly combined with water and used to reduce dust on unpaved roads generated by logging trucks. Design criteria prohibiting application of dust palliatives within 300 feet of CRLF breeding and non-breeding aquatic habitat would minimize the potential for dust palliatives to enter waterways or affect special status aquatic wildlife.

Pile Burning

CRLF may seek shelter in piles in damp upland locations, and may be wounded or killed when the piles are burned. Design criteria would prevent piles from being ignited within RCAs (within 150 feet of aquatic habitat). Piles being ignited within one mile of mapped breeding habitat would only be ignited on the side furthest from the aquatic habitat, providing opportunity for CRLF in the burn pile to escape. These design criteria would reduce the potential for individuals to be killed, injured, or disturbed from burning piles.

Salvage Harvest and Mechanical Fuels Reduction outside CRLF Habitat Buffers

Salvage harvest and mechanical fuels reduction treatments would occur outside the CRLF habitat buffer of 300 feet from aquatic habitat. The degree to which California red-legged frog individuals or habitat may be affected by timber harvest and mechanical fuels reduction treatments depends primarily on the intensity of activities in and immediately adjacent to riparian areas. The avoidance of these activities within 300 feet of aquatic habitat, avoids impacting habitat potentially used by the species. The following design criteria are included in the King Fire restoration project for this purpose:

- Exclusion of mechanical equipment activities and ground disturbing activities (other than hand-felling of hazard trees) within 300 feet of perennial and intermittent streams providing CRLF aquatic habitat.
- Implementation of a Limited Operating Period in units within one mile of CRLF breeding habitat during the rainy season (approx. Oct 15th – April 15th).

The Biological Opinion for the Sierra Nevada Forest Plan Amendment found that vegetation management activities occurring more than 300 feet from perennial streams and more than 150 feet from all other aquatic habitat would not be likely to adversely affect the California red-legged frog provided that activities within a mile of breeding habitat do not occur during the rainy season when frogs are likely to be dispersing overland. Application of the above design feature in the King Fire Restoration Project ensures that salvage harvest and mechanical fuels reduction activities are not likely to adversely affect the California red-legged frog. Since these activities are designed to reduce the potential size and severity of future wildfires in the affected

drainages, the project is expected to reduce potential impacts to aquatic habitats that could result from future wildfires or re-burns.

Design criteria, Standards and Guidelines, and BMP's are in place that will preclude effects from treated areas influencing untreated CRLF habitats. See Appendix C for the full description of Aquatic and Watershed design criteria that will be implemented to meet Best Management Practices and Forest Plan Standards and Guidelines.

Planting and Herbicide Application for Plantation Release

Reforestation could occur within portions of RCAs, but this would generally not occur in the CRLF aquatic and upland foraging/sheltering habitat since trees are not being removed from within 300 of habitat. Because planting and scalping are done by hand, potential direct effects to CRLF are limited to disturbance associated with the presence of workers. Planting activities would be short-term, and disturbance to CRLF would be minimal.

Following conifer planting, chemical herbicide treatments using glyphosate along with a surfactant and colorant, would be used to reduce shrub completion. In its Biological Opinion to the Sierra Nevada Forest Plan Amendment, (USDI Fish and Wildlife Service 2003), the FWS found that direct impacts to CRLF may occur from herbicide applications within the riparian area all year, and outside the riparian area during the wet season. Direct effects may occur if an adult or juvenile frog is sprayed during application or comes in contact with chemical residue on foliage or litter, and indirect effects may occur from alteration of terrestrial vegetation and invertebrate communities on which CRLF frogs depend. The potential for effects associated with herbicide application in the King Fire Restoration project has been virtually eliminated by design features which exclude herbicide application within 300 feet of CRLF aquatic habitat and which prevent the use of herbicides and chemical treatments during the wet season, when frogs could be making overland movements. In upland environments where glyphosate would be applied, it readily adheres to soil particles and is unlikely to enter groundwater or be mobilized after precipitation events based on detection studies performed on the ENF. Monitoring results, based on more than 150 surface water samples taken at locations in National Forests in California between 1991 and 2002 indicate that glyphosate applied by ground application seldom reached surface water even with "no spray" buffer widths as narrow as 10 feet (Bakke 2001; Frazier and Grant 2003). Additionally, herbicide monitoring for glyphosate in surface water on the ENF between 1993 and 2007 showed no detection of glyphosate in any of the 29 samples collected (Markman 2008). Ground cover in RCAs has been reduced by the King Fire, which will reduce infiltration and increase runoff during storm events. Nonetheless, buffers of 300 feet are substantial and will prevent glyphosate from entering aquatic habitat through runoff or drift, even in the post-fire landscape. Alternation of vegetation in CRLF foraging and sheltering habitat within 300 feet of aquatic habitat, and the potential for direct spray of individuals, will also be avoided through application of a 300 foot buffer.

Watershed Sensitive Areas

Watershed sensitive areas involve treatments in closer proximity to aquatic habitats (within CRLF habitat buffer) in areas determined to be at high risk of soil erosion and sedimentation. Two watershed sensitive treatment areas would affect approximately 5 acres of CRLF habitat. Treatments in these areas are designed to increase soil cover, surface organic matter and soil organic matter on sensitive soils or where accelerated runoff and erosion would pose unacceptable risk to resources. Treatments at these sites would not involve mechanized equipment and would therefore have low likelihood of injuring frogs or increasing habitat disturbance. Treatments include lop and scatter of trees less than 10 inches in diameter or cut and leave in place, application of certified weed-free straw mulch or seeding with approved native seed, designed to reduce effects to aquatic habitat.

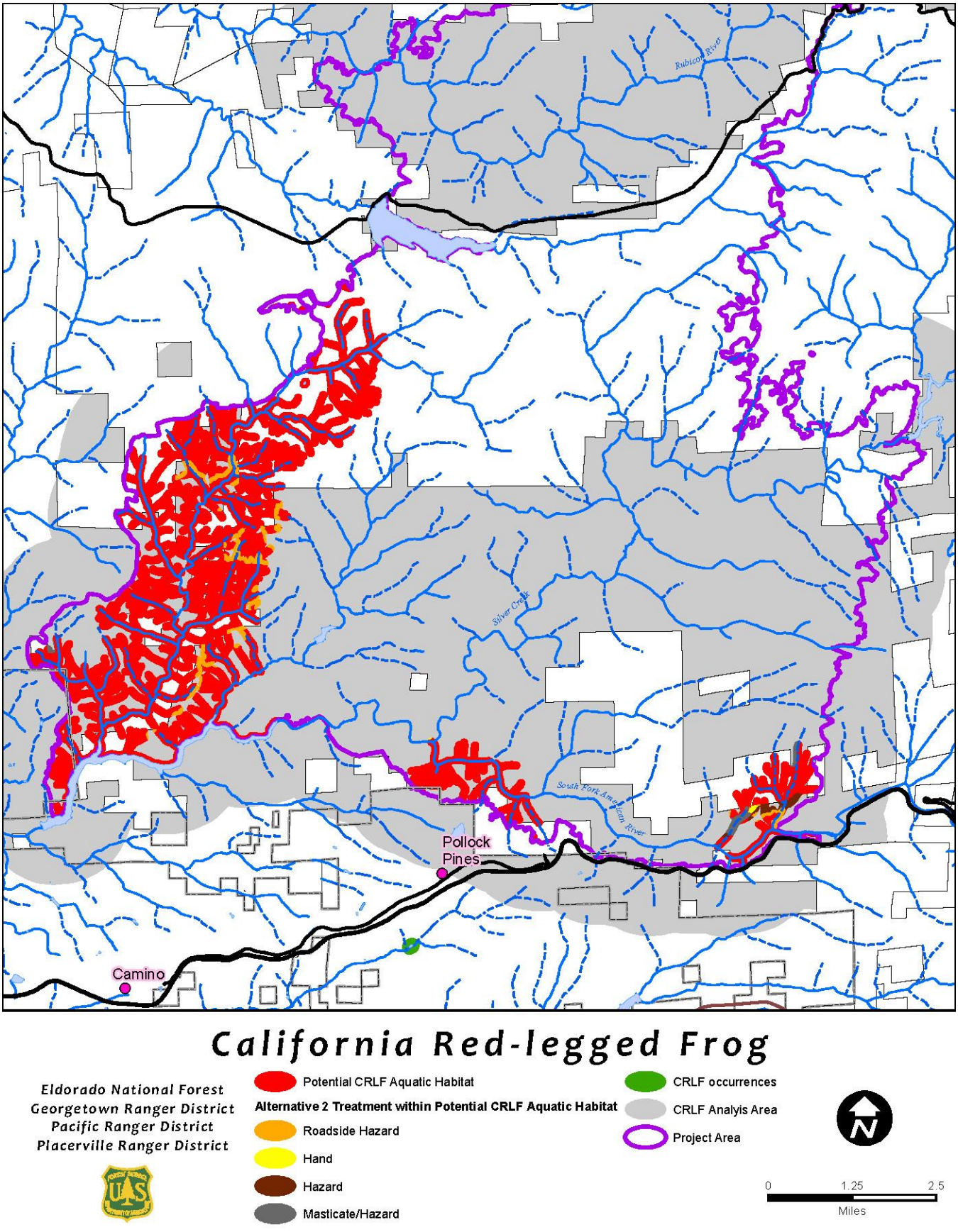

Rubicon River
Silver Creek
South Fork American River
Pollock Pines
Camino
California Red-legged Frog
Eldorado National Forest
Georgetown Ranger District
Pacific Ranger District
Placerville Ranger District
Potential CRLF Aquatic Habitat
Alternative 2 Treatment within Potential CRLF Aquatic Habitat
Roadside Hazard
Hand
Hazard
Masticate/Hazard
CRLF occurrences
CRLF Analyis Area
Project Area
N
0
1.25
2.5
Miles

Figure 2

Sierra Nevada Yellow-legged Frog

Acres of Alternative 2 Treatments in SNYLF Habitat	Acres
Burn only – prescribed burning in Rubicon drainage	7.1
Hazard – hand felling hazard trees	6.0
Roadside Hazard Tree Felling	19.2
Long Canyon Stream Restoration	5.8
Total	**37.8**

Approximately 40 acres of SNYLF habitat occurs within Alternative 2 treatment areas (figure 3). Because SNYLF have not been found within or near the project area during previous amphibian surveys, and because the potential breeding habitat is extremely limited, the areas of potential habitat for this species within the treatment areas are likely over-estimated and the risk of injury, mortality, or behavioral disturbance is low. Effects from the following types of treatments have been analyzed and described in the USDA Forest Service, Pacific Southwest Region Biological Assessment for Actions that Affect the Sierra Nevada Yellow-legged frog on National Forest Lands in the Sierra Nevada (2014). The following describes site-specific effects that are described more generally in programmatic assessment.

Felling of Roadside Hazard Trees and Other Hazard Trees

The SNYLF is typically found close to water (generally within 82 feet of aquatic habitat), and most long-distance movements appear to be between suitable aquatic habitats in close proximity. Design criteria prohibit operation of ground-based mechanical equipment within 100 feet of suitable SNYLF aquatic habitat, removing the risk to individuals from equipment operations. Figure 3 displays the overlap between SNYLF habitat and proposed treatment areas. Tree felling within SNYLF habitat could affect individuals; however, design criteria require hand felling away from the aquatic habitat, reducing the risk to SNYLF and its aquatic habitat. Individuals in suitable upland habitat would be expected to flee from the site of disturbance. Trees felled within SNYLF habitat would be left in place to avoid further site disturbance, unless otherwise determined by a qualified biologist, which would involve surveys prior to using equipment to remove the tree.

Road Construction, Reconstruction and Maintenance

Standard road maintenance activity (grading, brushing, etc.) would occur along project roads. Road construction and reconstruction within the SNYLF habitat buffer would be minimized through BMPs and design criteria. No off-road mechanical equipment would be allowed within 100 feet of SNYLF aquatic habitat, unless the RCA team is consulted for site-specific requirements. Design criteria require that for new stream crossings the RCA team must be consulted with for site-specific evaluation and requirements, which would involve site-specific evaluation by an aquatic biologist.

Water drafting is proposed for dust abatement on roads. Drafting has the potential to entrain (suck in) tadpoles or fish as the pump pulls in water. Entrainment and passage through the pump could be fatal to individuals or if the water is dispensed on a road or an upland area, mortality would likely result. Design criteria, such as the use of low intake velocity pumps and a screening device placed around the pump intake, would be implemented to reduce potential negative effects. Design criteria will also eliminate the risk of dewatering by limiting amount of drafting depending on streamflows and water levels to meet BMPs and through coordination with the RCA team. Since design criteria also require that each water drafting site be evaluated by an aquatic biologist for species presence prior to use, water drafting poses little risk to this species.

Dust palliatives such as magnesium chloride ($MgCl_2$) or lignin sulfonate are commonly combined with water and used to reduce dust on unpaved roads generated by logging trucks. Design criteria prohibiting application of

dust palliatives within 100 feet of CRLF breeding and non-breeding aquatic habitat would minimize the potential for dust palliatives to enter waterways or affect special status aquatic wildlife.

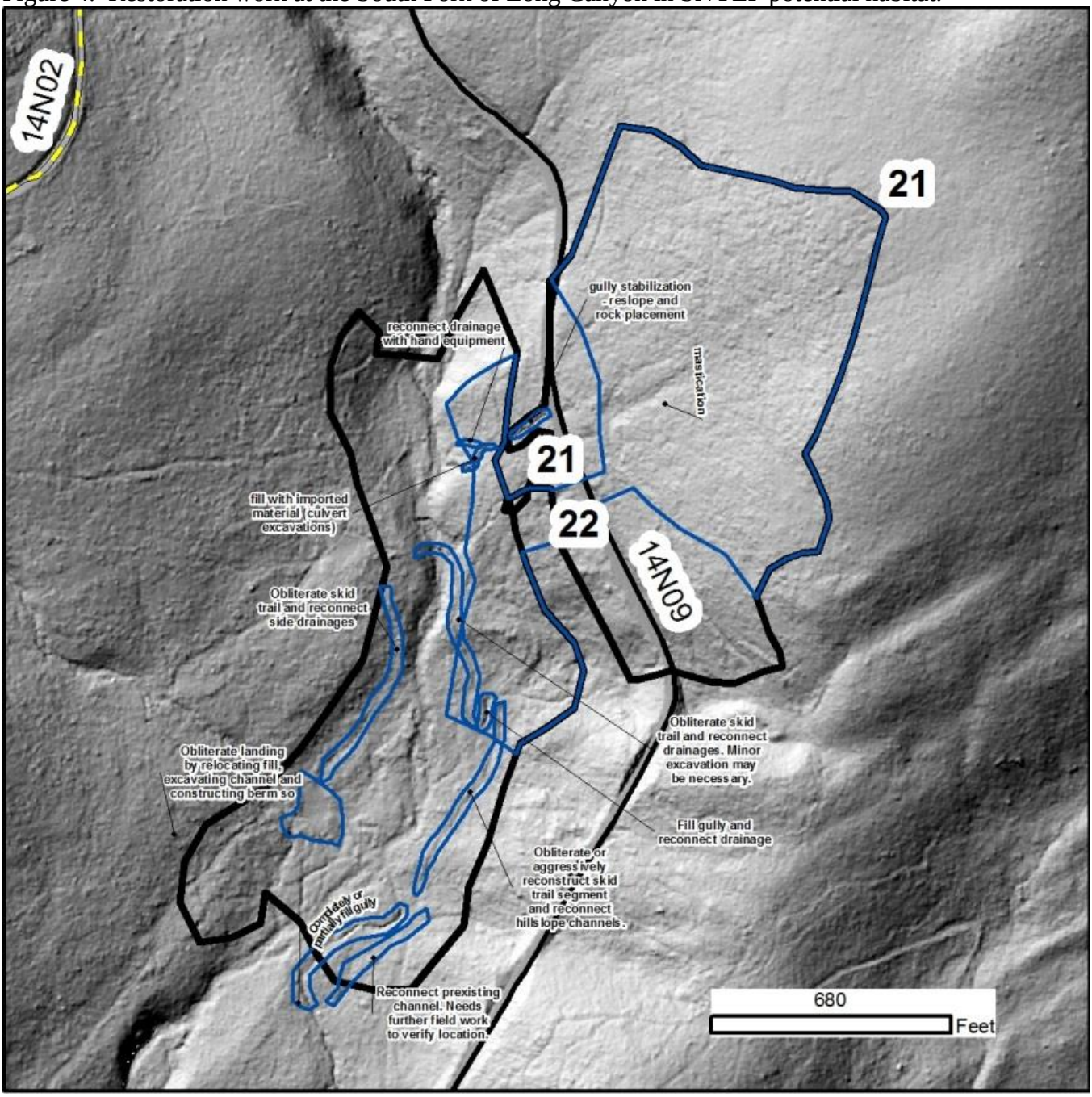
South Fork Long Canyon Stream Restoration Work – Figure 4

The following stream restoration work would occur within SNYLF habitat in the South Fork of Long Canyon to stabilize streambanks, reduce sediment delivery from past skid trails and improve aquatic habitat.

- Skid trails would be obliterated using ground based equipment to decompact and recontour disturbed sites to minimize future erosion potential.
- Mastication or lop and scatter of trees less than 10 inches would occur. Where mastication is impractical cut, lop, and scatter trees up to 16 inches;
- Fill gullies or stabilize headcuts with imported soil and rock. Oversteepend gully and headut walls would be resloped.
- Application of certified weed-free straw mulch or seeding with approved native seed.
- Hand felling of fire-killed trees into the stream channel to maintain or improve hydrologic function or aquatic habitat.
- Mechanically or by hand, reconnect channels disconnected by disturbances and road runoff. Included minor excavation and fill of ephemeral features.

Work would include operating equipment within SNYLF aquatic habitat to recontour and stabilize the streambanks and reshape the headwalls. SNYLF are highly associated with the aquatic habitat and if present could be directly affected by equipment operation. Excessive sedimentation from in-channel work could impact individuals as described in the general effects discussion. The design criteria require involvement of an aquatic biologist and would involve surveys for SNYLF prior to implementing activities. Materials for erosion control, such as tightly woven fiber netting, plastic monofilament netting, or similar materials are prohibited from use for erosion control when left exposed. Surveys conducted 24 hours prior to implementing restoration activities will ensure that activities do not impact SNYLF individuals, if they do happen to occur in the area.

Figure 4. Restoration work at the South Fork of Long Canyon in SNYLF potential habitat.



Planting and Herbicide Application for Plantation Release

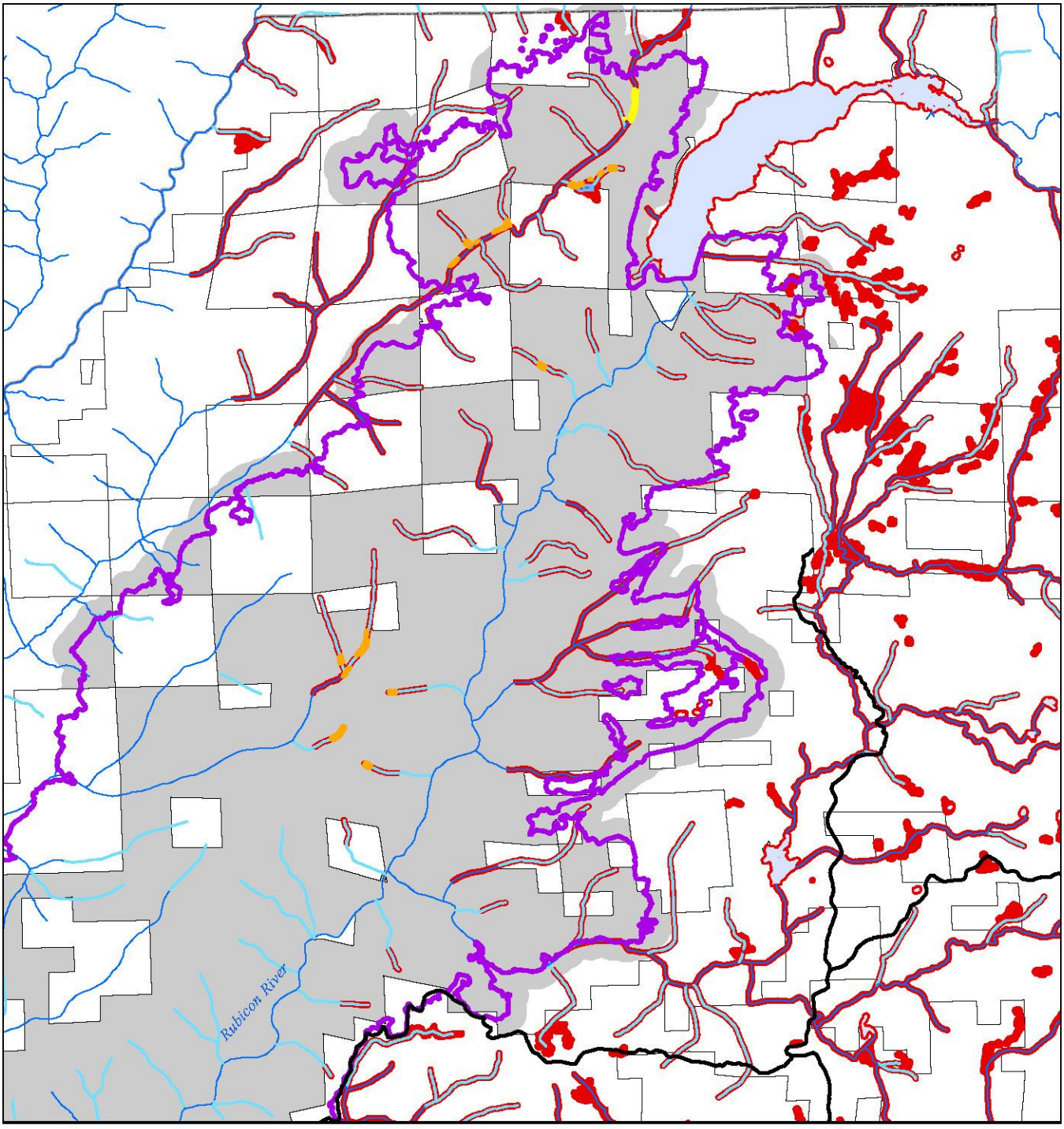
Risks to individuals from herbicide applications would be minimized through design criteria prohibiting application of herbicides within RCAs, which would prevent application within 300 feet of perennial streams, ponds, and meadows, and from within 150 feet adjacent to intermittent streams. Risks to amphibians from glyphosate under a worst case scenario are relatively low, and with the described buffers and application of BMPs, the risks of runoff affecting individuals directly or indirectly are virtually eliminated.

Fuels reduction activities may directly affect SNYLF as individuals may be harassed, injured, or killed during the construction of slash piles or during burning activities. SNYLF may seek shelter in piles in damp upland locations, and may be wounded or killed when the piles are burned. Design criteria would prevent piles from being ignited within suitable SNYLF habitat, thereby removing the risks associated with construction of slash piles and pile burning.

Prescribed Burning in Rubicon River Drainage

Prescribed burning in five to seven years,has been incorporated into the King Fire Restoration project in order to meet the objective of reducing risk of future large re-burns and reintroducing fire as a landscape process. This future project could affect 7 acres of mapped habitat. The immediate effects of wildlfire in the form of mortality of individuals and failed reproduction is expected to be a small threat to most healthy populations, unless stressors such as drought or persistent habitat change have left populations isolated or with an extremely limited distribution (USFS 2013). The prescribed fire treatment is designed to minimize effects to RCAs, and the design criteria prohibit igniting prescribed burn within RCAs, which contains buffers exceeding suitable SNYLF habitat. These design criteria would minimize potential impacts to individual SNYLF. The Recovery Plan for the California Red-legged frog (USDI 2002) recommends developing guidelines for fire management practices (i.e., prescribed burns) to decrease incidental impacts to the CRLF especially when doing so will enhance ecosystem health (e.g., reduce fuels, control non-native plants) as well as decrease chances of catastrophic fires.

Effects may include loss of downed woody debris after prescribed burning activities. Within RCAs an aquatic biologist may require that some downed wood aggregations be hand-lined to prevent fire from consuming woody debris aggregations. Prescribed fire treatments would be allowed to back burn into riparian areas to treat fuels and enhance riparian areas through regrowth, but no active ignition would occur within the RCA.



Sierra Nevada Yellow-legged Frog

Eldorado National Forest
Georgetown Ranger District
Pacific Ranger District
Placerville Ranger District

Alternative 2 Roadside Hazard within SNYLF Habitat
Alternative 2 WSA within SNYLF Habitat
SNYLF Habitat
Utilization Unknown
SNYLF Analysis Area
Project Area

N

0 0.75 1.5
Miles

Figure 3

Valley elderberry longhorn beetle

Acres of Alternative 2 Treatments in Potential VELB Habitat	Acres
Biomass removal	1
Hand felling fire-killed trees	156
Roadside Hazard Tree Removal	145
Total	**302**

Because virtually all of the VELB lifecycle is spent on elderberry shrubs, either inside the stems as larvae or on the foliage or flowers as adults, protection of these shrubs and their immediate surrounding vicinity eliminates almost all risk to individuals associated with implementation of the action alternatives. Design Criteria TW-6 requires that treatment units below 3,000 feet in elevation be surveyed for the presence of elderberry prior to project activities. These surveys have occurred and no elderberry has been detected.

If elderberry were detected, plants with stems 1 inch in diameter or larger would be flagged and activities would not occur within a 100 foot buffered area surrounding these plants. This design criteria implements avoidance measures recommended by the US Fish and Wildlife Service for avoiding effects to the Valley elderberry longhorn beetle (USDI FWS Valley Elderberry Longhorn Beetle Conservation Guidelines).

SUMMARY

California red-legged frogs and Sierra Nevada yellow-legged frogs are not known to occur in the project area; while possible, habitat occupancy is unlikely for either species based on nearest known populations, results of past surveys, and less than preferred habitats. Mechanical salvage harvest, roadside hazard abatement, road maintenance and temporary road construction, stream crossing upgrades, mechanical fuels reduction treatments, pile burning, reforestation and herbicide applications have been designed in a manner that minimizes effects to both species.

Determination of Effects

Table 9. Effects determinations and rationale for the CRLF, SNYL and VELB.

Species and status / Critical Habitat	Determination for the Proposed Action	Rational for the Determination
Sierra Nevada yellow-legged frog *Endangered, FS Sensitive*	*May affect, likely to adversely affect*	• Surveys conducted in the project area have not detected SNYLF • 19 acres of habitat would receive roadside hazard tree felling; project-related disturbance of individuals and habitat could occur but is minimized with project design criteria. • Vehicle use, road maintenance, and road reconstruction could result in crushing individuals and short term increases in sediment delivery to streams, potentially reducing quantity and quality of stream habitat and reducing reproductive success. • Species surveys would occur prior to watershed improvement treatments in SNYLF habitat in Long Canyon WSA. • Prescribed fire use could affect 7 acres of habitat, effects are minimized with project design criteria. • Waterholes will be surveyed by an aquatic biologist prior to use and will not be used if SNYLF are present. • Potential effects will be minimized by implementation of S&G's, BMP's, and design criteria.

Species and status / Critical Habitat	Determination for the Proposed Action	Rational for the Determination
		• This consultation tiers to the USFWS programmatic biological opinion on three Sierra Nevada amphibians, issued December 19, 2014; see project appendage form.
Sierra Nevada yellow-legged frog proposed critical habitat	*Will not affect proposed critical habitat*	• No treatments or activities are proposed within proposed critical habitat. • The project and aquatic analysis areas are outside of proposed critical habitat.
California red-legged frog *Threatened*	*May affect, not likely to adversely affect*	• Surveys conducted in project area habitat have not detected CRLF; the closest detection is more than 2 miles distance in a watershed outside the project area. • GIS mapped breeding habitat is scattered and isolated stream segments, and therefore marginal for a breeding population. • Ground-based mechanical equipment is excluded within 300 feet of CRLF aquatic breeding and non-breeding habitat. • Limited Operating Period limits off-road equipment use in units that occur within one mile of CRLF breeding habitat, following the first fall rains, reducing disturbance potential during period of potential overland movement. • This project implements buffer distances that would allow for a finding of NLAA for fuels and vegetation management activities, based on the Biological Opinion for the Sierra Nevada Forest Plan Amendment. • Waterholes will be surveyed by an aquatic biologist prior to use and will not be used if SNYLF are present. • Restrictions on herbicide use and chemical dust abatement use within 300 feet of CRLF aquatic habitat. • Potential effects will be further minimized by implementation of S&G's, BMP's, and design criteria.
California red-legged frog critical habitat	*Will not affect critical habitat*	• No treatments or activities are proposed within critical habitat. • The project and aquatic analysis areas are outside of critical habitat.
Valley elderberry longhorn beetle *Threatened*	*Will not affect*	• Activity areas have been surveyed for elderberry; elderberry plants have not been recorded in these areas. • Design criteria ensure protection of VELB habitat in accordance with USFWS recommended protection measure, should the species or its host plant be detected.

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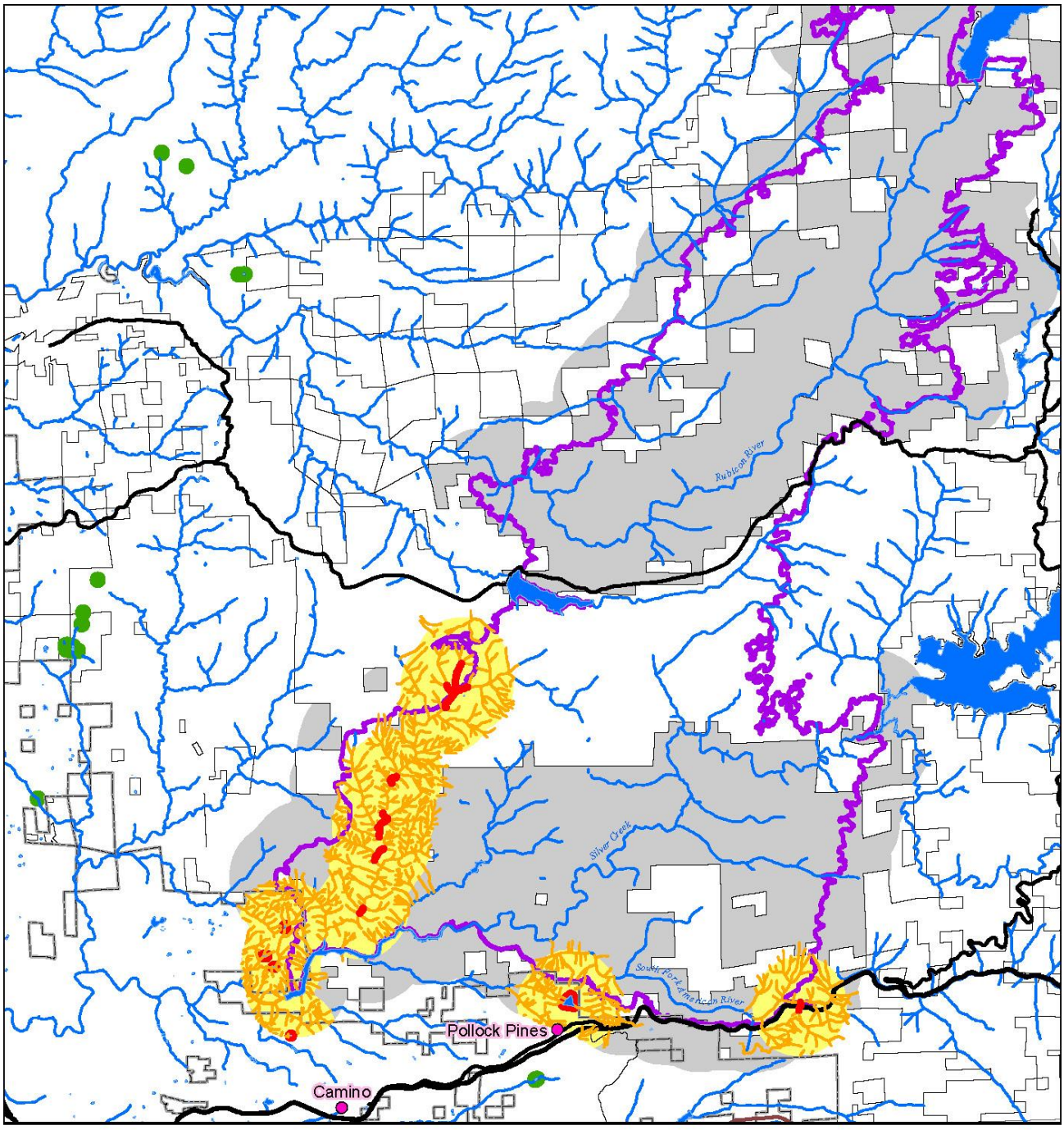
Appendix A

Habitat Maps



California Red-legged Frog

Eldorado National Forest
Georgetown Ranger District
Pacific Ranger District
Placerville Ranger District

CRLF occurrences
CRLF Analyis Area
Project Area
Potential CRLF Aquatic Habitat
Potential CRLF Breeding Habitat
Potential CRLF Upland Habitat

0 2 4
Miles

Figure A-1. California red-legged frog habitat.

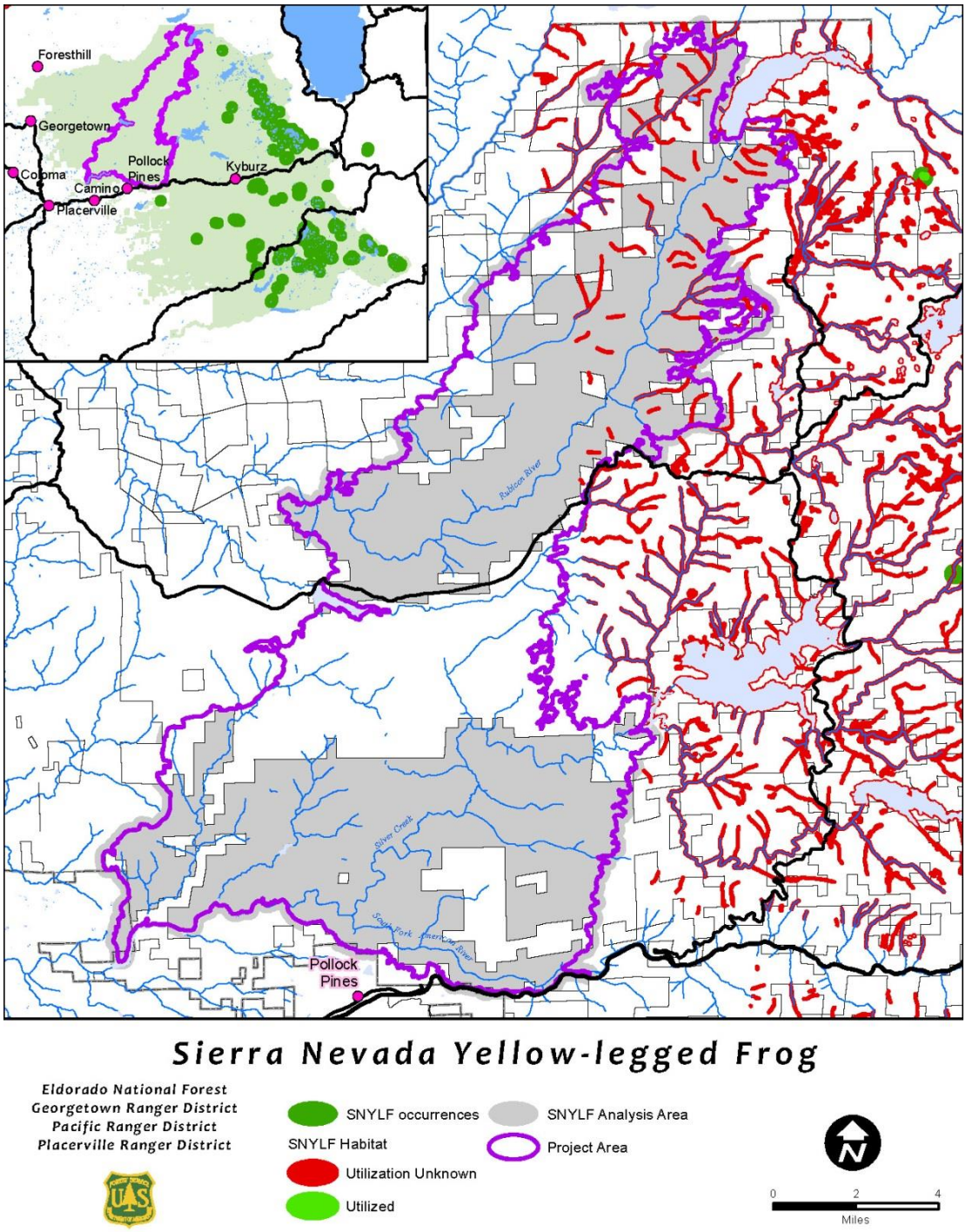
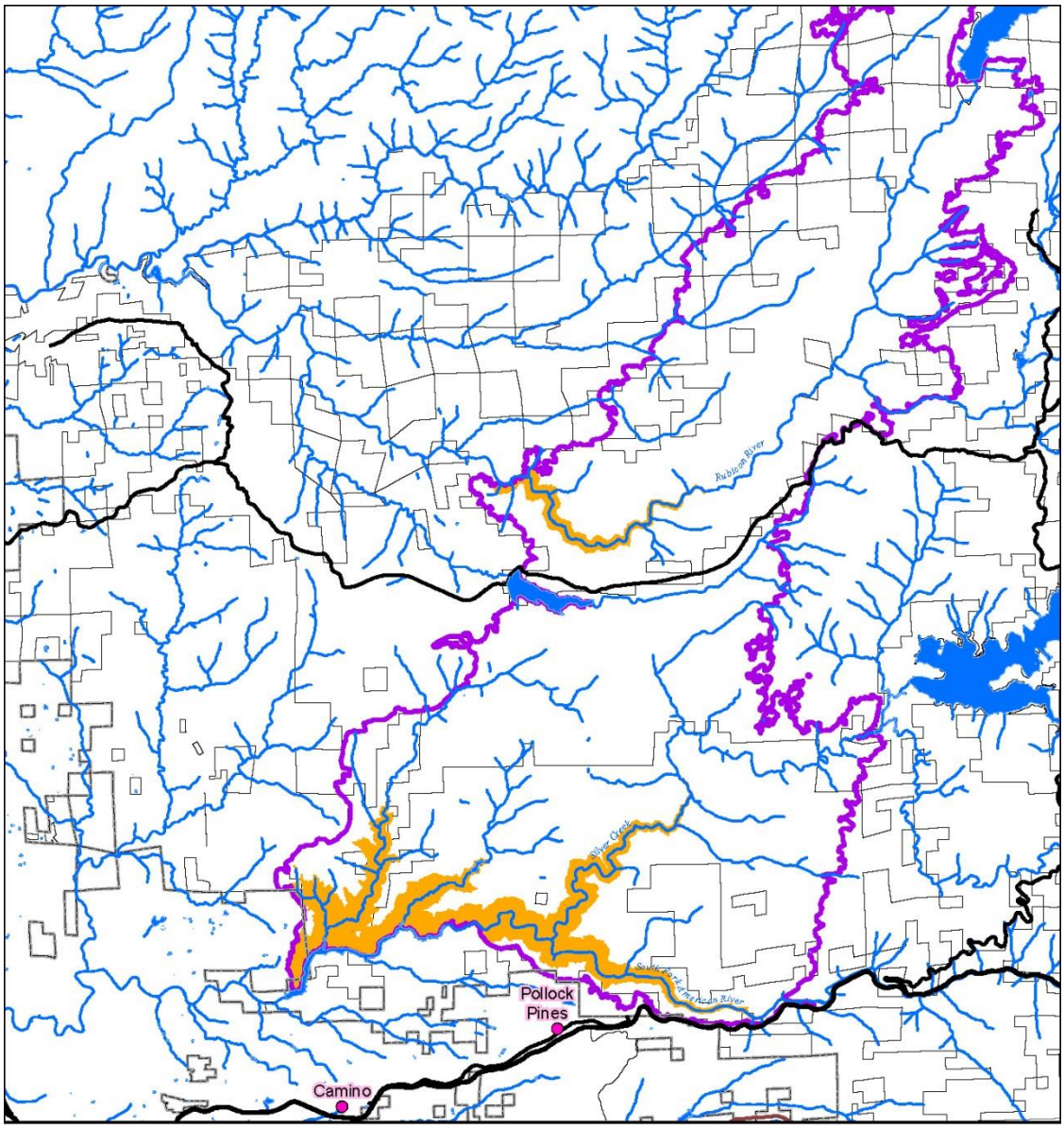


Figure A-2. Sierra Nevada yellow-legged frog habitat.



Valley Elderberry Longhorn Beetle

Eldorado National Forest
Georgetown Ranger District
Pacific Ranger District
Placerville Ranger District

Potential VELB Habitat
Project Area

N

0 2 4
Miles

Figure A-3. Valley elderberry longhorn beetle habitat.

Appendix B

Design Criteria for Aquatic Resources

Table 2.14. Exclusion zones for mechanical equipment in proximity to aquatic features.

Aquatic Feature Type	Exclusion Distance In Feet[3]
Perennial Streams and Special Aquatic Features	100
Intermittent Streams above 4,500 feet elevation	100
Intermittent Streams below 4500' elev.	50
Ephemeral Streams above 4,500' elev.	25
Ephemeral Streams below 4,500' elev.	10

[1] Perennial streams flow year-long. Intermittent streams flow during the wet season but dry by summer or fall. Ephemeral streams flow only during or shortly after rainfall or snowmelt. SAFs include lakes, ponds, meadows, bogs, fens, wetlands, vernal pools, and springs.

[3] Or 25 feet beyond riparian vegetation, whichever is greater. Riparian vegetation is composed of the plant species that grow in or adjacent to streams, meadows, seeps, springs, etc., where soils are inundated or saturated for varying durations of the growing season. Typically, some or many of these component species are classified as obligate wetland or facultative wetland by the USGS. Examples include willows, alders, dogwood, big-leaf maple, Indian rhubarb, monkey flower, sedges, rushes, mosses, etc.

Operating Requirements Within Equipment Exclusion Zones:

- Equipment reach in for removal of logs by full suspension may be allowed upon consultation with the RCA team.
- The RCA team will review any potential use of existing landings within mechanical exclusion zones.
- Localized exceptions to operating requirements or equipment exclusion may occur where recommended by the RCA team to benefit riparian, aquatic and hydrologic resources.
- Water drafting, and watershed sensitive area restoration actions may occur within the equipment exclusion zone consistent with all other Design Criteria.

Operating Requirements Within the Riparian Conservation Area (RCA), but outside the Equipment Exclusion Zone

- Use existing skid trails and landings to the extent use will avoid impact from new trails and landings.
- Consult with a member of the RCA team for new landing construction or expansion of existing landings.
- Do not construct new primary skid trails or landings within 150 feet of perennial or intermittent streams or SAFs.
- Do not construct new primary skid trails or landings within 50 feet of ephemeral streams; concurrence from RCA team is required for new landing construction within 150 feet of ephemeral streams.
- Use only low ground pressure track laying machines, such as feller bunchers and masticators, rubber tired skidders and track laying tractors.

Table 2.14. Exclusion zones for mechanical equipment in proximity to aquatic features.

Aquatic Feature Type[1]	Exclusion Distance In Feet[2]
Perennial Streams and Special Aquatic Features	100
Intermittent Streams above 4,500 feet elevation	100
Intermittent Streams below 4500' elev.	50
Ephemeral Streams above 4,500' elev.	25
Ephemeral Streams below 4,500' elev.	10

[1] Perennial streams flow year-long. Intermittent streams flow during the wet season but dry by summer or fall. Ephemeral streams flow only during or shortly after rainfall or snowmelt. SAFs include lakes, ponds, meadows, bogs, fens, wetlands, vernal pools, and springs.

[2] Exclusion distance is 25 feet beyond riparian vegetation, if greater. Riparian vegetation is composed of the plant species that grow in or adjacent to streams, meadows, seeps, springs, etc., where soils are inundated or saturated for varying durations of the growing season. Typically, some or many of these component species are classified as obligate wetland or facultative wetland by the USGS. Examples include willows, alders, dogwood, big-leaf maple, Indian rhubarb, monkey flower, sedges, rushes, mosses, etc.

Table 2.15 Summary of Design Criteria

ID (see Chapter 3)	Name	Measure
RIPARIAN CONSERVATION AREAS AND AQUATIC RESOURCES For the applicable design criteria discussed below, the California red-legged frog (CRLF) buffer is within 300 feet of CRLF breeding and non-breeding aquatic habitat, as mapped by the aquatic biologist. The Sierra Nevada yellow-legged frog (SNYLF) buffer is within 100 feet of SNYLF aquatic habitat as mapped by the aquatic biologist.		
RCA-1	Operating Requirements	Operating requirements for ground-based mechanized equipment in RCAs within specific buffer zones are presented in Table 2.14 above. Exceptions to the operating requirements, such as use of existing landings, may occur with concurrence from the RCA team, which consists of Forest Service hydrologist, soil scientist, botanist, or aquatic biologist. RCAs are defined in the SNFPA as 300 feet each side of perennial streams and special aquatic features, and 150 feet each side of intermittent and ephemeral streams. See Table 2.14 (above) for a detailed description.
RCA-2	Equipment in RCA	Use only low ground pressure track laying machines, such as feller bunchers and masticators Use only low ground pressure track laying machines, such as feller bunchers and masticators, rubber tired skidders and track laying machines.
RCA-3	Allowance for Equipment in Exclusion Zones (Table 2.14)	Mechanical equipment may operate in equipment exclusion zones for water drafting and for Watershed Sensitive Area RCA restoration actions, consistent with all other design criteria.
RCA-4	Soil Cover in RCAs	Within the RCAs, 70% soil cover would be maintained when possible and dominated by material less than 3 inches in diameter. For watershed sensitive areas, a minimum of 70% soil cover would be attained. Application methods could include cutting and lopping, or mastication of pre-commercial material, cutting and scattering of activity material, non-whole tree harvesting methods, or weed-free mulch applications. Utilize onsite biomass to generate mulch materials wherever possible.
General		
AR-1	Special-Status Species Sighting	If a sensitive or listed amphibian or turtle is sighted within the project area, cease operations in the sighting area, and inform a Forest Service aquatic biologist of the sighting immediately. Before commencing activities, consultation may need to be reinitiated with United States Fish and Wildlife Service (USFWS).
AR-2	Fish Passage	When replacing or adding culverts, design them to pass the 100-year flood flow plus associated sediment and debris; armor to withstand design flows and provide desired passage of fish and other aquatic organisms where appropriate.
AR-3	Materials for Erosion Control	Do not use tightly woven fiber netting, plastic monofilament netting, or similar materials for erosion control or other purposes in the SNYLF buffer when netting is left exposed.
Hazard Tree Removal and Mechanical Operations		
AR-4	Ground disturbing activities in CRLF and SNYLF buffers	Ground disturbing activities in CRLF and SNYLF buffers will be limited to hand-felling of hazard trees as specified in AR-5 except where activities have been site-specifically described and analyzed in the project Biological Assessment.

ID (see Chapter 3)	Name	Measure
AR-5	Hazard Trees within CRLF and SNYLF buffers	Within the CRLF and SNYLF buffer, trees may be hand-felled away from the channel and SAFs to abate hazards, but will be left in place to avoid further site disturbance. If mechanical removal of the tree is necessary, a qualified biologist will perform a survey 24 hours before project activities occur in the area. If CRLF or SNYLF are detected, follow design criteria AR-1.
AR-6	Hazard Trees in Mechanical Exclusion Zone	Within the mechanical exclusion zone in Table 2.14, trees may be hand felled to abate imminent hazards. If logs can't be removed with full suspension, they will be left in place. The portion of a felled tree outside of mechanical exclusion zone or on a road may be bucked and removed. If hazard trees must be removed from within the mechanical exclusion zone, consult with the RCA team for specific site exceptions and requirements for down wood retention. .
AR-7	New Stream Crossings	New crossings are limited to dry channels. Consult with a member of the RCA team for new crossings on intermittent streams. Crossings would be limited to armored channels and approaches of less than 15% grade. Number of crossing on ephemeral channels should not exceed 3 per mile of stream.
AR-8	Erosion Control	End-lining is not permitted through riparian vegetation. Grooves and bare soil created by end-lining will be mitigated with hand-built water bars and/or slash placement. Slash in the RCA will be lopped and scattered (not to exceed 18"). Removal of trees across a perennial, intermittent or ephemeral stream will require full suspension across the entire channel. If full suspension cannot be obtained then the portion of the log that cannot be suspended will be left in the riparian buffer.
AR-9	Soil Cover in RCAs	When operating within the RCAs, 70% soil cover would be maintained dominated by material less than 3 inches in diameter. Application methods could include cutting and lopping, or mastication of pre-commercial material, cutting and scattering of activity material, non-whole tree harvesting methods, or weed-free mulch applications. Utilize onsite biomass to generate mulch materials wherever possible.
AR-10	Guidelines for Skid Trails and Landings	Do not construct new primary skid trails or landings within 150 feet of perennial or intermittent streams or SAFs or within 50 feet of ephemeral streams. Consult with the RCA team if expanding or constructing landings or skid trails in the RCA outside these zones. Use existing skid trails and landings to the extent use will avoid impact from new trails and landings.
AR-11	Equipment Operations in CRLF Habitat During Wet Season	Off-road mechanical equipment operations will not occur within 1 mile of areas identified as CRLF breeding habitat during the wet season (defined as starting with the first frontal rain event that deposits a minimum of 0.25 inch of rain after October 15 and ending April 15).
AR-16	Hand-felling Trees for Aquatic Habitat Improvement	Where recommended by the RCA team, fire-killed trees within the mechanical exclusion buffer may be hand-felled into the stream channel to maintain or improve hydrologic function or aquatic habitat, If within CRLF or SNYLF habitat, a qualified biologist will perform a survey 24 hours before project activities occur in the area. If CRLF or SNYLF are detected, follow design criteria AR-1.
Reforestation		
AR-12	Reforestation Near Riparian Areas	No reforestation activities would occur within mechanical exclusion zones or within 25 feet of riparian vegetation along perennial or intermittent streams and SAFs, with the exception of planting native riparian hardwood and understory species.

ID (see Chapter 3)	Name	Measure
Herbicide Use and Chemical Dust Abatement		
AR-13	Restricted Areas for Herbicide Application	No herbicide application within CRLF buffers , within RCAs of perennial and intermittent streams, or within 25 feet of ephemeral streams. Exceptions for targeted invasive plant treatments shall be reviewed and approved by the aquatic biologist and will be covered under the Forest-Wide Treatment of Invasive Plant Environmental Assessment (ENF 2013).
AR-14	Stream Buffers for Dust Abatement Use	No chemicals for dust abatement would be applied within 100 feet of perennial or intermittent streams and SAFs, within 25 feet of ephemeral streams, or within CRLF buffers.
AR-15	No Spray Areas	No herbicides would be used in the upper Incline Creek watershed, located northeast of Brush Creek Reservoir for the purpose of facilitating the California Central Valley Regional Water Quality Control Board water quality study.
Large Wood Retention within RCAs		
AR-17	Large Wood Retention	Where harvest occurs within the RCA, leave a minimum of 10-20 pieces of large wood per acre (standing and on the ground) within the treatment unit. Large wood is defined as being a minimum of 12 inches in diameter and 10 feet in length. The largest trees should be retained; however, a range of sizes may be included.
Burning		
AR-18	Igniting Hand Piles in CRLF Habitat	When igniting hand piles within 1 mile of suitable CRLF breeding habitat, ignite only on one side, not to exceed half the circumference of the pile, on the side furthest from the nearest aquatic feature.
AR-19	Consultation with Forest Service (FS) Aquatic Biologist	Consultation with aquatic biologist will occur when proposing to treat noxious weeds using torching methods within CRLF and SNYLF habitat buffers.
AR-20	Ignition Avoidance Areas	Do not actively ignite prescribed fire within RCAs, or piles within CRLF or SNYLF buffers.
ID (see Chapter 3)	**Name**	**Measure**
Water Drafting		
AR-21	Water Drafting Assessment	An aquatic biologist will assess the water drafting sites for sensitive and listed species prior to using. If sensitive, threatened, or endangered species are identified at a potential water drafting site, that site would not be used for water drafting.
AR-22	Pump Intake Screens	In perennial and intermittent streams, pump intake screens shall have openings not exceeding 3/32-inch (0.09375 inch) and be sized according to the pump intake capacity. Place hose intake into bucket in the deepest part of the pool. Use a low-velocity water pump and do not pump natural ponds to low levels beyond which they cannot recover quickly (approximately one hour).
AR-23	Water Drafting on Fish-Bearing	For water drafting on fish-bearing streams: do not exceed 350 gallons per minute for streamflow greater than or

ID (see Chapter 3)	Name	Measure
	Streams	equal to 4.0 cubic feet per second (cfs); do not exceed 20% of surface flows below 4.0 cfs; and cease drafting when bypass surface flow drops below 1.5 cfs.
AR-24	Water Drafting on Non-Fish-Bearing Streams	For water drafting on non-fish-bearing streams: do not exceed 350 gallons per minute for stream flow greater than or equal to 2.0 cfs; do not exceed 50% of surface flow; and cease drafting when bypass surface flow drops below 10 gallons per minute. Water sources designed for permanent installation, such as piped diversions to offsite storage, are preferred over temporary, short-term-use developments. Locate water drafting sites to avoid adverse effects to instream flows and depletion of pool habitat.
AR-25	In-Channel Water Drafting Locations	In-channel water drafting locations will include rocking of approaches, barrier rock, straw wattles, straw bales, or other measures to prevent overflow and leaks from entering the watercourse.
WATER AND SOILS		
WS-1	Soil Retention	Although 100% soil cover is considered ideal for soil stabilization, the following minimum values should be retained to the extent practical and allowable by fuel loading limits: a. 50% on slopes less than 25%; and b. 70% within RCAs, slopes greater than 25% and within WSAs.
WS-2	Skid Trail and Landing Guidelines	Use existing skid trails and landings where practical. Limit skid trail footprint (main and branching secondary trails) to less than 15% of the unit area or to the existing disturbed area.
WS-3	Subsoil and Slash and Biomass Guidelines	Subsoil if feasible and place slash or biomass material on skid trails and temporary roads between landings and a distance of 100 feet from landings. A 25-foot-wide slash mat will also be placed on the downslope portion of landings. All slash mats will be crushed either by equipment treads or equipment heads.
WS-4	Mitigations and Restoration of Mechanical Activities	As mitigations to mechanized activities and as restoration activity in WSAs, slash mats will be placed on primary skid trails with a goal of 100% soil cover to the extent material is available. In lieu of slash, skid trails may be subsoiled where topographic conditions would be favorable or biomass is deficient. In addition, landings and temporary roads will be subsoiled and additional erosion control measures applied after use is completed. Subsoiling may be excluded from areas of high soil sensitivity, such as shallow or rocky soils or where extensive regrowth of bear clover has established. Obliterate outsloped berms. Outslope reused skid trails where gullies formed from water concentration along insloped segments.
WS-5	Protection Measures for Ground-Based Equipment	Limit ground-based equipment (except masticators) to less than 35% slopes and masticators to 45% slopes unless a soil scientist evaluates soil conditions and disturbance patterns to determine operability on steeper slopes. Feller bunchers may do short pitches up to 45% slope.
WS-6	Erosion Control on Skid Trails	Use a very high erosion hazard rating when considering application of erosion control on skid trails unless otherwise determined by the soil scientist at the time of activities. In areas where slash mats will be placed as erosion control, use a moderate erosion hazard rating to determine waterbar spacing.
WS-7	Decommissioning Skid Trails	Once skid trails are decommissioned, construct earth berms and/or place logs and/or rocks to discourage unauthorized motor vehicle use.
WS-8	Screen Protection Measures for Trails	To discourage pioneering OHV travel off system trails, leave a 10-foot screen on both sides of system trails in proposed units. Screens would consist of retained surface material and standing non-commercial trees where

ID (see Chapter 3)	Name	Measure
		available.
WS-9	Planning for Road, Trail, and Landings	Temporary roads, skid trails, and landings shall be planned and located to avoid unstable areas and connected headwall scarps and swales. These areas will be identified and flagged for avoidance. Where feasible, temporary roads, skid trails, and landings will be drained away from headwall scarps and swales.
WS-10	Limitations for Burn Piles	Burn piles would generally be limited to a footprint not exceeding 10% of a unit. When feasible, place piles on existing mechanical disturbances.
WS-11	Excess Biomass Placement	Where feasible, place excess biomass at the outlet of waterdips and waterbars.
WS-12	Protection Measures in WSAs	When working within WSAs: a. Inform a member of the RCA team when implementation will occur on a unit that has a WSA or a stand-alone WSA. b. Consider mastication as the primary method of cover treatment. Use lop and scatter or import weed-free material when mastication is not practical. c. Obliterate tread depressions from mechanical equipment operating in the 100-foot RCA exclusion zone.

Appendix C

Best Management Practices and Riparian Conservation Objectives Consistency

King Fire Restoration Project
Eldorado National Forest – Georgetown and Pacific Ranger Districts
Riparian Conservation Objectives Consistency Report
April 8, 2015

This report evaluates the King Fire Restoration Project with respect to the Riparian Conservation Objectives (RCOs) and associated Standards and Guidelines (S&Gs) of the Sierra Nevada Forest Plan Amendment (SNFPA) of 2004, which amends the Eldorado National Forest Plan of 1988.

Implementation of this project is expected to meet all of the RCOs and associated S&Gs.

/s/

Vince Pacific, Hydrologist

/s/

Maura Santora, Aquatic Biologist

/s/

Blake Engelhardt, Botanist

/s/

Eric Nicita, Soil Scientist

The Sierra Nevada Forest Plan Amendment Record of Decision (SNFPAROD) of 2004 requires that a site-specific analysis be conducted in order to determine the type and extent of activities that can occur within Riparian Conservation Areas (RCAs) adjacent to aquatic features. Descriptions of RCAs as designated by SNFPROD (2004) are presented in Table 1.

Table 1. Riparian Conservation Areas (RCAs) Adjacent to Aquatic Features as Designated by the Sierra Nevada Forest Plan Amendment Record of Decision (SNFPROD) of 2004.[1]

Aquatic feature	Riparian Conservation Area
Perennial stream	300 feet on each side of the stream, measured from the bank full edge of the stream
Seasonally flowing streams (includes intermittent and ephemeral streams)	150 feet on each side of the stream, measured from the bank full edge of the stream
Special aquatic features (includes lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs)	300 feet from the edge of the features or riparian vegetation, whichever width is greater
Perennial streams with riparian conditions extending more than 150 feet from the edge of the streambank or seasonally flow streams extending more than 50 feet from the edge of the	300 feet from the edge of the features or riparian vegetation, whichever width is greater
Streams in inner gorge	Top of inner gorge. (The inner gorge is defined by stream adjacent slopes greater than 70% gradient.)
Other hydrological or topographic depressions without a defined channel	RCA width and protection measures determined through project level analysis

[1] Riparian Conservation Areas (RCAs) are designated on page 42 of the SNFPAROD (2004); RCOs are described on pages 33 and 34.

Many RCAs burned at high intensity during the King Fire, which resulted in removal of groundcover and riparian vegetation, and increased erosion and sediment transport to streams. Treatment activities are proposed within RCAs that burned at moderate and high intensity to reduce future fuel loading and promote improvements to habitat and water quality. "Treatment zones" have been designated within RCAs, which have specific operating guidelines (Table 2.13 of the EIS). These include mechanical exclusion zones that generally range from 50-100 feet or greater on perennial and intermittent streams (or 25 feet beyond the edge of riparian vegetation, whichever is greater), and 10-25 feet or greater on ephemeral streams. At a limited number of locations (referred to as Watershed Sensitive Areas in the EIS), some ground disturbance is proposed within mechanical exclusion zones where additional work is necessary to promote recovery or fall hazard trees within these areas. Varied levels of ground disturbance would be permitted in middle and outer treatment zones. BMPs, mitigation measures, and project design criteria would minimize potential for impacts. Implementation of the proposed action would likely result in short-term impacts to riparian and aquatic habitat from logging-related compaction and erosion, but long-term improvements to RCAs and associated aquatic features and habitat by increasing groundcover and reducing erosion and sediment transport to streams and other aquatic features. Treatment activities would also reduce or eliminate erosion from past ground disturbances within and adjacent to RCAs, the severity of which has increased as a result of the fire.

The SNFPROD (2004) contains six RCOs that apply to activities within RCAs.

Riparian Conservation Objective #1: *Ensure that identified beneficial uses for the water body are adequately protected. Identify the specific beneficial uses for the project area, water quality goals from the Regional Basin Plan, and the manner in which the standards and guidelines will protect the beneficial uses.*

The California Regional Water Quality Control Board, Central Valley Region, has established beneficial uses for surface water bodies in the *Fourth Edition of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins* (2007). The project area is within both the Middle Fork of the American River Watershed and the South Fork of the American River Watershed. Currently, the Middle Fork American River from its source to Folsom Lake, California, has been designated by the State for: municipal and domestic supply, irrigation, stock watering, power, contact and other non-contact recreation, canoeing and rafting, warm and cold freshwater fisheries habitat migration and spawning, and wildlife habitat. The South Fork American River, from its source to Placerville, has been designated by the State for: municipal and domestic water supply, power, contact and other non-contact recreation, canoeing and rafting, warm and cold freshwater fisheries habitat migration and spawning, and wildlife habitat. The Stumpy Meadows Reservoir, which is adjacent to the project site, is the sole drinking water supply for the town of Georgetown and surrounding areas.

The California Regional Water Quality Control Board, Central Valley Region, has established water quality objectives for inland surface waters in the Sacramento and San Joaquin River Basins (Appendix A). Parameters of particular concern with respect to the proposed action would be sediment, settleable materials, suspended materials, and turbidity. These parameters have the potential to adversely impact water quality and aquatic habitat which could in turn affect beneficial uses of water. BMPs and project design criteria would be applied to ensure adequate protection of the beneficial uses of water within the project area. These would include near-stream riparian mechanical exclusion zones and post-implementation groundcover requirements.

The *Section 303(d) List of Water Quality Limited Segments* (2006) was created by the Central Valley Regional Board to comply with Section 303(d) of the Clean Water Act of 1972 which requires each state to identify water bodies that fail to meet applicable water quality standards established by the US EPA. The South Fork American River, from below Slab Creek Reservoir to Folsom Lake, is on the State 303(d) List with respect to elevated levels of mercury due to resource extraction (mining). This project would not impact mercury concentrations in the South Fork American River. No other 303(d) streams are located within or downstream of the project area.

Each RCO contains applicable standards and guidelines. See Appendix B for analysis of each standard and guideline with respect to the proposed actions. The implementation of these standards and guidelines, along with applicable BMPs, would protect the beneficial uses of water.

Riparian Conservation Objective #2: *Maintain or restore: 1) the geomorphic and biological characteristics of special aquatic features, including lakes, meadows, bogs, fens, wetlands, vernal pools, springs; 2) streams, including instream flows; and 3) hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species.*

The primary threat to these aquatic features is the increased watershed response in uplands burned by the fire. Post-fire BAER treatments included mulching to reduce soil erosion and maintenance and improvements to road drainage structures to reduce the potential for road washouts. Project activities may have some short-term impacts to the geomorphic and biological characteristics of streams and other aquatic features within the project area. For example, there is potential for compaction, erosion, and sediment delivery to aquatic features with use of heavy machinery in RCAs which could decrease the quality of cold water fish habitat by infilling pools and embedding spawning gravels. Alternatively, land disturbance could cause concentration of surface runoff, which could result in detrimental changes to stream channel condition that could subsequently have effects on downstream water quality and beneficial uses. However, BMPs, project design criteria, and applicable standards and guidelines would minimize impacts. Further, the areas where work is proposed within RCAs burned at high intensity, and all groundcover and riparian vegetation was

fully consumed at most locations. Salvage logging would result in increased groundcover that would reduce sediment transport to streams and aid in riparian zone recovery following the fire.

The project also proposes small-scale stream and RCA restoration, such as treating gullies and stabilizing streambanks at a limited number of locations. Larger-scale restoration of impaired aquatic features is outside the scope of this project; however, identified restoration needs may be addressed in future projects.

Riparian Conservation Objective #3: *Ensure a renewable supply of large down logs that: 1) can reach the stream channel, and 2) provide suitable habitat within and adjacent to the RCA.*

Mechanical exclusion zones within RCAs (Table 2.13 of the EIS) would ensure a renewable supply of large down logs within and adjacent to stream channels due to the large number of snags within these areas. In the areas outside of mechanical exclusion zones, but still within RCAs, requirements for standing snags and large down logs would ensure a long-term supply of large wood to provide suitable habitat. Reforestation, following requirements set forth in project design criteria, in areas that are salvage logged would also contribute to long-term large wood recruitment.

Riparian Conservation Objective #4: *Ensure that management activities, including fuels reduction actions, within RCAs and CARs enhance or maintain physical and biological characteristics associated with aquatic- and riparian-dependent species.*

No CARs are present within the project area. The Proposed Action would result in short-term impacts but long-term improvements to RCAs. Use of heavy machinery in and adjacent to RCAs may lead to ground disturbance and increased potential for sediment transport to streams. However, BMPs and project design criteria would limit the potential for these short-term impacts. While short-term impacts may occur, the project would lead to long-term improvements and enhance both the physical and biological characteristics associated with aquatic- and riparian-dependent species. For example, groundcover was fully consumed in many of the logging units, and implementation of this project would increase groundcover which would reduce future erosion.

Riparian Conservation Objective #5: *Preserve, restore, or enhance special aquatic features, such as meadows, lakes, ponds, bogs, fens, and wetlands to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.*

In general, mechanical exclusion would prevent disturbance to aquatic features. Treatments in middle and outer RCA zones may result in short-term impacts such as soil compaction and erosion. However, BMPs and project design criteria would minimize potential for these short-term impacts. The areas in which treatments are proposed burned at high intensity and little to no groundcover or riparian vegetation is present. Implementation of project design criteria would result in increased groundcover, and planting trees and native riparian vegetation in areas that are logged is proposed would enhance habitat over the long-term in areas of moderate and high burn severity.

Riparian Conservation Objective #6: *Identify and implement restoration actions to maintain, restore, or enhance water quality and maintain, restore, or enhance habitat for riparian and aquatic species.*

Project activities would increase groundcover and provide habitat within RCAs due to snag and large down wood design criteria. Treatments would also include obliteration of existing disturbances such as old skid trails and landings that are current sources of erosion. The project also proposes small-scale stream and RCA restoration projects, such as stabilizing streambanks and gullies at a limited number of locations. Implementation of these projects would restore or enhance water quality and habitat for riparian and aquatic species. Larger-scale restoration of impaired

aquatic features is outside the scope of this project; however, identified restoration needs may be addressed in future projects.

References Cited

Central Valley Regional Water Quality Control Board. 2008. Internet Site containing the proposed 303(d) list for the central valley region of California http://www.waterboards.ca.gov/tmdl/docs/303dlists2006/final/r5_final303dlist.pdf

Central Valley Regional Water Quality Control Board. 2009. Internet containing Basin Plan for the Central Valley Region. http:/www.swrcb.ca.gov/centralvalley/water_issues/basin_plans

USDA Forest Service. January 2004. Sierra Nevada Forest Plan Amendment, Final Environmental Impact Statement, Record of Decision.

WATER QUALITY OBJECTIVES FOR INLAND SURFACE WATERS

Category	Standard
Bacteria	In waters designated for contact recreation, the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.
Chemical Constituents	Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses.
Color	Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.
Dissolved Oxygen	Dissolved oxygen concentrations shall not be reduced below the following minimum levels at any time: ▪ Waters designated WARM 5.0 mg/l ▪ Waters designated COLD 7.0 mg/l ▪ Waters designated SPWN 7.0 mg/l
Floating Material	Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses.
Oil and Grease	Waters shall not contain oils, greases, waxes, or other material in concentrations that cause nuisance, result in visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
pH	The pH shall not be depressed below 6.5 nor raised above 8.5.
Pesticides	▪ No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. ▪ Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses. ▪ Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the EPA or the Executive Officer. ▪ Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section 131.12.). ▪ Pesticide concentrations shall not exceed the lowest levels technically and

	economically achievable. ▪ Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15. ▪ Waters designated for use as domestic or municipal supply shall not contain concentrations of thiobencarb in excess of 1.0 µg/l.
Total Dissolved Solids	Shall not exceed 100 mg/l (90 percentile)
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Category	**Standard**
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Tastes and Odors	Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.
Temperature	At no time or place shall the temperature of COLD or WARM interstate waters be increased more than 5˚F above natural receiving water temperature.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: ▪ Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2. ▪ Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU. ▪ Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent. ▪ Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs. ▪ Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

California Regional Water Quality Control Board, Central Valley Region, Basin Plan (2007).

APPENDIX B. RIPARIAN CONSERVATION (RCAs & RCOs) STANDARDS and GUIDELINES

Riparian Conservation Areas and Critical Aquatic Refuges	
Standard and Guideline	**Analysis with respect to Proposed Action**
91. Designate riparian conservation area (RCA) widths as described in Table 6 above. The RCA widths displayed in Table 2 may be adjusted at the project level if a landscape analysis has been completed and a site-specific RCO analysis demonstrates a need for different widths.	RCA widths are shown in Table 2.13 of the EIS, which includes mechanical exclusion zones and middle and outer zones with specific operating requirements and restrictions. The widths were chosen as they would provide for improvement to riparian zone conditions while at the same time providing adequate protection for RCAs and dependent species.
92. Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.	There are no CARs within the project area. The proposed activities within RCAs would be consistent with RCOs, and implementation of this project would maintain or improve aquatic habitat and channel complexity from its current post-fire condition. The proposed activities would be implemented with applicable BMPs and project design criteria, and by following RCA and RCO standards and guidelines to minimize potential for activity-related sediment from entering streams and negatively impacting aquatic and riparian-dependent plant and animal species.
93. Identify existing uses and activities in CARs and RCAs during landscape analysis. At the time of permit reissuance, evaluate and consider actions needed for consistency with RCOs.	Existing uses and activities were identified as part of project analysis. Implementation of BMPs and project design criteria would ensure consistency with RCOs.
94. As part of project-level analysis, conduct peer reviews for projects that propose ground-disturbing activities in more than 25 percent of the RCA or more than 15 percent of a CAR.	There are no CARs within the project area, and the footprint of ground disturbing activities in RCAs would not exceed the 25% threshold. Therefore, peer reviews are not necessary.
Riparian Conservation Objective #1: Ensure that identified beneficial uses for the water body are adequately protected. Identify the specific beneficial uses for the project area, water quality goals from the Regional Basin Plan, and the manner in which the standards and guidelines will protect the beneficial uses. (AMS goals: 1, 2, 7)	
95. For waters designated as "Water Quality Limited" (Clean Water Act Section 303(d)), participate in the development of Total Maximum Daily Loads (TMDLs) and TMDL Implementation Plans. Execute applicable elements of completed TMDL Implementation Plans.	The South Fork American River, from below Slab Creek Reservoir to Folsom Lake, is on the 303(d) list of impaired waters with respect to elevated levels of mercury due to resource extraction (mining). This project would not impact mercury levels in the South Fork American River and the TMDL monitoring plan would not be applicable to this project.

Standard and Guideline	Analysis with respect to Proposed Action
96. Ensure that management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages.	The proposed activities would have negligible short term effects on water temperature. With the exception of hazard trees, no trees would be felled within streamside mechanical exclusion zones. Salvage logging within RCAs outside of the mechanical exclusion zone would only occur in areas of moderate to high burn intensity where the majority of trees had all needles consumed and thus provide little to no shade. Natural regeneration of riparian vegetation is already occurring and will provide stream shade as it becomes reestablished.
97. Limit pesticide applications to cases where project level analysis indicates that pesticide applications are consistent with riparian conservation objectives.	No new pesticide use within RCAs is proposed for this project. Limited pesticide use for targeted invasive species treatment would continue under the previous project decision Forestwide Treatment of Invasive Species Project (ENF 2013), which includes project design criteria to protect RCAs and associated plant and animal species.
98. Within 500 feet of known occupied sites for the California red-legged frog, Cascades frog, Yosemite toad, foothill yellow-legged frog, mountain yellow-legged frog, and northern leopard frog, design pesticide applications to avoid adverse effects to individuals and their habitats.	Pesticides would not be used within 500 feet of known occupied sites for California red-legged frog or within 300 feet of suitable habitat for mountain yellow-legged frog. Herbicide application for targeted invasive plant treatment within 500 feet will be reviewed and approved annually by the FS aquatic biologist, and design criteria will be implemented to ensure there is no adverse effect to individuals or their habitats.
99. Prohibit storage of fuels and other toxic materials within RCAs and CARs except at designated administrative sites and sites covered by a Special Use Authorization. Prohibit refueling within RCAs and CARs unless there are no other alternatives. Ensure that spill plans are reviewed and up-to-date.	Following BMPs and project design criteria, the storage of fuels and other toxic materials, servicing, and refueling would not occur within RCAs. BMPs and spill prevention measures to avoid adverse impacts to nearby water bodies would be implemented. Up-to-date spill plans would be required and reviewed prior to project implementation.
Riparian Conservation Objective #2: Maintain or restore: (1) the geomorphic and biological characteristics of special aquatic features, including lakes, meadows, bogs, fens, wetlands, vernal pools, springs; (2) streams, including in stream flows; and (3) hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species. (AMS goals: 2, 3, 4, 5, 6, 8, 9)	
100. Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.	Roads and trails that are disrupting natural surface and subsurface pathways and transporting sediment towards stream channels have been identified during field reconnaissance and through examination of LiDAR data. Treatment of these disturbances would enhance watershed hydrologic function and connectivity. Treatments may include subsoiling, waterbarring, removal of inslope berms, outsloping, backblading, and/or slash placement.

Standard and Guideline	Analysis with respect to Proposed Action
102. Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs.	As a result of the fire, some sections of streams have characteristics that are not within the natural range of variability. For example, in areas where the riparian zone burned at high intensity, large wood within and adjacent to the stream channel was often consumed, and these sections of the streams are now deficient in large wood concentrations. Due to the large concentration of snags within RCAs that burned at high intensity, large wood concentrations within streams and throughout the RCA are expected to recover to within the natural range of variability. Further, in the areas of the RCAs outside of the mechanical exclusion zones where salvage logging is permitted, project design criteria require that minimum numbers of both standing and down large wood is retained to provide for long term recruitment.
103. Prevent disturbance to streambanks and natural lake and pond shorelines caused by resource activities (for example, livestock, off-highway vehicles, and dispersed recreation) from exceeding 20 percent of stream reach or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling, and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites, sites authorized under Special Use Permits and designated off-highway vehicle routes.	Mechanical exclusion zones in RCAs (Table 2.13 of the EIS) would prevent disturbance to streambanks as a result of project activities. Project design criteria limit the number of stream crossings and include specific measures to reduce potential impacts to streambanks. Disturbance to streambanks would not exceed 20 percent of a stream reach. Natural lake and pond shorelines would not be impacted by this project.
104. In stream reaches occupied by, or identified as “essential habitat” in the conservation assessment for, the Lahontan and Paiute cutthroat trout and the Little Kern golden trout, limit streambank disturbance from livestock to 10 percent of the occupied or “essential habitat” stream reach. (Conservation assessments are described in the record of decision.) Cooperate with State and Federal agencies to develop streambank disturbance standards for threatened, endangered, and sensitive species. Use the regional streambank assessment protocol. Implement corrective action where disturbance limits have been exceeded.	Not applicable to this project.

Standard and Guideline	Analysis with respect to Proposed Action
105. At either the landscape or project-scale, determine if the age class, structural diversity, composition, and cover of riparian vegetation are within the range of natural variability for the vegetative community. If conditions are outside the range of natural variability, consider implementing mitigation and/or restoration actions that will result in an upward trend. Actions could include restoration of aspen or other riparian vegetation where conifer encroachment is identified as a problem.	Riparian vegetation cover is currently outside of the natural range of variability in RCAs that burned at high intensity as most if not all vegetation was consumed by fire in these areas. Project design criteria and BMPs, in particular near-stream and riparian vegetation exclusion zones, are designed to reduce impacts to recovering riparian vegetation. Riparian vegetation is expected to recover quickly, and resprouting willows, maples, and sedges have already been observed in many areas.
106. Cooperate with Federal, Tribal, State and local governments to secure in stream flows needed to maintain, recover, and restore riparian resources, channel conditions, and aquatic habitat. Maintain in stream flows to protect aquatic systems to which species are uniquely adapted. Minimize the effects of stream diversions or other flow modifications from hydroelectric projects on threatened, endangered, and sensitive species.	Water rights are held by the Forest Service and water use would adhere to those limits specified in the water rights. Project design criteria and BMPs require that water drafting sites be approved by a hydrologist and aquatic biologist prior to use and specify flow thresholds in which water drafting must cease. With implementation of design criteria, water drafting would not adversely impact stream flows or lead to pool depletion. The project does not propose flow modifications from hydroelectric projects.
107. For exempt hydroelectric facilities on national forest lands, ensure that special use permit language provides adequate in stream flow requirements to maintain, restore, or recover favorable ecological conditions for local riparian- and aquatic-dependent species.	Not applicable to this project.
Riparian Conservation Objective #3: Ensure a renewable supply of large down logs that: (1) can reach the stream channel and (2) provide suitable habitat within and adjacent to the RCA. (AMS goals: 2, 3)	
108. Determine if the level of coarse large woody debris (CWD) is within the range of natural variability in terms of frequency and distribution and is sufficient to sustain stream channel physical complexity and stability. Ensure proposed management activities move conditions toward the range of natural variability.	In RCAs that burned at high intensity, CWD within and adjacent to some sections of stream channels was fully consumed, and therefore these areas are deficient in CWD. This project is designed to retain an adequate recruitment source for CWD due to near-stream mechanical exclusion zones and snag and CWD requirements. CWD within stream channels would also remain in place. At those channels in which visual reconnaissance occurred, CWD levels were found to be within the range of natural variability both upstream and downstream of sections that burned at high intensity.
Riparian Conservation Objective #4: Ensure that management activities, including fuels reduction actions, within RCAs and CARs enhance or maintain physical and biological characteristics associated with aquatic- and riparian-dependent species. (AMS goals: 2, 7)	

Standard and Guideline	Analysis with respect to Proposed Action
109. Within CARs, in occupied habitat or "essential habitat" as identified in conservation assessments for threatened, endangered, or sensitive species, evaluate the appropriate role, timing, and extent of prescribed fire. Avoid direct lighting within riparian vegetation; prescribed fires may back into riparian vegetation areas. Develop mitigation measures to avoid impacts to these species whenever ground-disturbing equipment is used.	Pile burning would be permitted in treatment units when necessary to reduce ground fuel accumulation. Project design criteria stipulate that burn piles would not be located within 100' of suitable CRLF or SNYLF habitat. Design criteria also require that piles would only be ignited on the side furthest from the nearest aquatic feature when within 1 mile of suitable CRLF or SNYLF habitat, or within 100 feet of streams and waterbodies. These requirements would also protect riparian vegetation.
110. Use screening devices for water drafting pumps. (Fire suppression activities are exempt during initial attack.) Use pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats.	Specifications for pump intake screens and minimum flow requirements for drafting would minimize impacts to, and removal of, aquatic species. Low velocity pumps would also be required.
111. Design prescribed fire treatments to minimize disturbance of groundcover and riparian vegetation in RCAs. In burn plans for project areas that include, or are adjacent to RCAs, identify mitigation measures to minimize the spread of fire into riparian vegetation. In determining which mitigation measures to adopt, weigh the potential harm of mitigation measures, for example fire lines, against the risks and benefits of prescribed fire entering riparian vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could be damaging to habitat or long-term function of the riparian community.	Project design criteria stipulate that burn piles would not be located within 100' of suitable CRLF or SNYLF habitat. Design criteria also require that piles would only be ignited on the side furthest from the nearest aquatic feature when within 1 mile of suitable CRLF or SNYLF habitat, or within 100 feet of streams and waterbodies. Project design criteria also stipulate that direct lighting of prescribed fires would not occur in riparian areas and would identify mitigation measures to minimize spread of fire into riparian vegetation. Due to project design criteria impacts to riparian vegetation and riparian- and aquatic-dependent species are not anticipated.
112. Post-wildfire management activities in RCAs and CARs should emphasize enhancing native vegetation cover, stabilizing channels by non-structural means, minimizing adverse effects from the existing road network, and carrying out activities identified in landscape analyses. Post-wildfire operations shall minimize the exposure of bare soil.	This project is designed to promote an upward trend in RCA conditions. Tree removal is proposed within RCAs (but outside of mechanical exclusion zones) where fire burned at moderate to high intensities. In these areas, most, if not all, groundcover and CWD was consumed, and barren ground, erosion, and sediment transport to streams has occurred at many locations. Project design criteria require 70% groundcover and various levels of CWD within RCAs, which would reduce erosion. This level of groundcover is not expected to negatively impact reestablishment of native vegetation, and planting of native riparian vegetation is proposed where recovery is limited. When sensitive plant species are present (see Botanical Resource Design Criteria), depth of slash material is limited to 2 inches so as not to impact reestablishment of these species.

Riparian Conservation Objective #5: Preserve, restore, or enhance special aquatic features, such as meadows, lakes, ponds, bogs, fens, and wetlands, to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas. (AMS goals 1, 2, 3, 4, 7, 9)	
113. Allow hazard tree removal within RCAs or CARs. Allow mechanical ground disturbing fuels treatments, salvage harvest, or commercial fuelwood cutting within RCAs or CARs when the activity is consistent with RCOs. Utilize low ground pressure equipment, helicopters, over the snow logging, or other non-ground disturbing actions to operate off of existing roads when needed to achieve RCOs. Ensure that existing roads, landings, and skid trails meet Best Management Practices. Minimize the construction of new skid trails or roads for access into RCAs for fuel treatments, salvage harvest, commercial fuelwood cutting, or hazard tree removal.	Hazard tree removal is proposed within RCAs, including within the mechanical exclusion zone when necessary. Operating requirements for ground based mechanical equipment generally prevent removal of hazard trees (but allow for felling) within near-stream exclusion zones to prevent ground disturbances, the exception being if logs can be removed with full suspension. Tree removal and other fuel treatments consistent with RCOs would be permitted in RCAs outside of the mechanical exclusion zone. Low ground pressure equipment would be required within RCAs to minimize negative impacts from logging operations, and groundcover and CWD requirement would improve RCA function and habitat that have been degraded as a result of the fire. Existing roads, landings, and skid trails would be required to meet BMPs, and all skid trails, temporary roads, and landings would be decommissioned after use. Construction of new skid trails in RCAs (outside of exclusion zones) would be limited to allow for achievement of RCOs.
114. As appropriate, assess and document aquatic conditions following the Regional Stream Condition Inventory protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog.	Project design criteria require that a qualified aquatic biologist would perform a survey 24 hours before project implementation to assess and document aquatic conditions. The survey would follow the methodology set forth by the USFWS.
15. During fire suppression activities, consider impacts to aquatic- and riparian-dependent resources. Where possible, locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of RCAs or CARs. During pre-suppression planning, determine guidelines for suppression activities, including avoidance of potential adverse effects to aquatic- and riparian-dependent species as a goal.	Fire suppression in response to prescribed burning is not anticipated due to requirements set forth in the burn plan. However, if suppression is necessary, or if a wildfire were to occur within the project area, incident activities would not be located within RCAs, and pre-suppression planning would occur to avoid potential adverse effects to aquatic- and riparian-dependent species.
116. Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.	Roads, trails, etc. were identified during project analysis. Based upon field reconnaissance and analysis of LiDAR data, areas that have, or have potential to, degrade water quality and/or habitat were identified. These include previous logging disturbances such as roads, skid trails, and landings. Implementation of the proposed treatments in these areas would follow project design criteria and BMPs, and the treatments would reduce or eliminate negative impacts to water quality and/or habitat from these disturbances. The proposed actions would ensure consistency with applicable standards and guidelines and desired conditions.

Standard and Guideline	Analysis with respect to Proposed Action
117. Assess the hydrologic function of meadow habitats and other special aquatic features during range management analysis. Ensure that characteristics of special features are, at a minimum, at Proper Functioning Condition, as defined in the appropriate Technical Reports (or their successor publications): (1) "Process for Assessing PFC" TR 1737-9 (1993), "PFC for Lotic Areas" USDI TR 1737-15 (1998) or (2) "PFC for Lentic Riparian-Wetland Areas" USDI TR 1737-11 (1994).	Range management analysis is not applicable to this project.
118. Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles. Criteria for defining bogs and fens include, but are not limited to, presence of: (1) sphagnum moss (*Spagnum spp*.), (2) mosses belonging to the genus *Meessia*, and (3) sundew (*Drosera spp*.) Complete initial plant inventories of bogs and fens within active grazing allotments prior to re-issuing permits.	There are no bogs or fens known within the areas proposed for treatment. Botanical surveys will be conducted prior to project implementation and if any fens or bogs are detected within proposed treatment units they will be protected by design criteria and mechanical exclusion zones.
19. Locate new facilities for gathering livestock and pack stock outside of meadows and riparian conservation areas. During project-level planning, evaluate and consider relocating existing livestock facilities outside of meadows and riparian areas. Prior to re-issuing grazing permits, assess the compatibility of livestock management facilities located in riparian conservation areas with riparian conservation objectives.	Range management analysis is not applicable to this project.

Standard and Guideline	Analysis with respect to Proposed Action
120. Under season-long grazing: • For meadows in early-seral status: limit livestock utilization of grass and grass-like plants to 30 percent (or minimum 6-inch stubble height). • For meadows in late seral status: limit livestock utilization of grass and grass-like plants to a maximum of 40 percent (or minimum 4-inch stubble height). Determine ecological status on all key areas monitored for grazing utilization prior to establishing utilization levels. Use Regional ecological scorecards and range plant list in regional range handbooks to determine ecological status. Analyze meadow ecological status every 3 to 5 years. If meadow ecological status is determined to be moving in a downward trend, modify or suspend grazing. Include ecological status data in a spatially explicit Geographical Information System database. Under intensive grazing systems (such as rest-rotation and deferred rotation) where meadows are receiving a period of rest, utilization levels can be higher than the levels described above if the meadow is maintained in late seral status and meadow-associated species are not being impacted. Degraded meadows (such as those in early-seral status with greater than 10 percent of the meadow area in bare soil and active erosion) require total rest from grazing until they have recovered and have moved to mid- or late seral status.	Range management analysis is not applicable to this project.
121. Limit browsing to no more than 20 percent of the annual leader growth of mature riparian shrubs and no more than 20 percent of individual seedlings. Remove livestock from any area of an allotment when browsing indicates a change in livestock preference from grazing herbaceous vegetation to browsing woody riparian vegetation.	Range management analysis is not applicable to this project.
Riparian Conservation Objective #6: Identify and implement restoration actions to maintain, restore or enhance water quality and maintain, restore, or enhance habitat for riparian and aquatic species. (AMS goals: all)	

22. Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards, (2) areas with lowered water tables, or (3) areas that are either actively down cutting or that have historic gullies. Identify other management practices, for example, road building, recreational use, grazing, and timber harvests, that may be contributing to the observed degradation.	Management practices and past disturbances that have caused degradation have been identified. These include old roads, skid trails, and landings. Restoration is proposed in areas with compaction in excess of soil quality standards, and at locations where disturbances are present and contributing to rill and gully erosion and sediment transport to streams and other aquatic features. Restoration activities include decommissioning of old roads, skid trails, and landings, increasing groundcover, and treating gullies and stabilizing streambanks. Long-term restoration activities are outside the scope of this project, but identified projects may be implemented under future projects.

Table developed from Standards and Guidelines on pages 62-66 of the 2004 SNFPA ROD.